



United States Environmental Protection Agency
Washington, DC 20460
Completion Form For Injection Wells

Administrative Information

1. Permittee Florence Copper Inc.		
Address (Permanent Mailing Address) (Street, City, and ZIP Code) 1575 W Hunt Hwy, Florence, AZ 85132		
2. Operator Florence Copper Inc.		
Address (Street, City, State and ZIP Code) 1575 W Hunt Hwy, Florence, AZ 85132		
3. Facility Name Florence Copper Inc.	Telephone Number (520) 374-3984	
Address (Street, City, State and ZIP Code) 1575 W Hunt Hwy, Florence, AZ 85132		
4. Surface Location Description of Injection Well(s)		
State Arizona	County Pinal	
Surface Location Description		
SW 1/4 of SW 1/4 of NE 1/4 of SW 1/4 of Section 28 Township 4S Range 9E		
Locate well in two directions from nearest lines of quarter section and drilling unit		
Surface		
Location 1080 ft. frm (N/S) N Line of quarter section and 1190 ft. from (E/W) E Line of quarter section.		
Well Activity <input type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Brine Disposal <input type="checkbox"/> Enhanced Recovery <input type="checkbox"/> Hydrocarbon Storage <input checked="" type="checkbox"/> Class III <input type="checkbox"/> Other	Well Status <input checked="" type="checkbox"/> Operating <input type="checkbox"/> Modification/Conversion <input type="checkbox"/> Proposed	Type of Permit <input type="checkbox"/> Individual <input checked="" type="checkbox"/> Area : Number of Wells 33
Lease Number NA	Well Number R-07	

Submit with this Completion Form the attachments listed in Attachments for Completion Form.

Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment (Ref. 40 CFR 144.32)

Name and Official Title (Please type or print) Ian Ream, Senior Hydrogeologist	Signature 	Date Signed 9-12-2018
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PAPERWORK REDUCTION ACT

The public reporting and record keeping burden for this collection of information is estimated to average 49 hours per response for a Class I hazardous facility, and 47 hours per response for a Class I non-hazardous facility. Burden means the total time, effort, or financial resource expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal Agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to the collection of information; search data sources; complete and review the collection of information; and, transmit or otherwise disclose the information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including the use of automated collection techniques to Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed forms to this address.

Attachments to be submitted with the Completion report:

I. Geologic Information

1. Lithology and Stratigraphy

A. Provide a geologic description of the rock units penetrated by name, age, depth, thickness, and lithology of each rock unit penetrated.

B. Provide a description of the injection unit.

- (1) Name
- (2) Depth (drilled)
- (3) Thickness
- (4) Formation fluid pressure
- (5) Age of unit
- (6) Porosity (avg.)
- (7) Permeability
- (8) Bottom hole temperature
- (9) Lithology
- (10) Bottom hold pressure
- (11) Fracture pressure

C. Provide chemical characteristics of formation fluid (attach chemical analysis).

D. Provide a description of freshwater aquifers.

- (1) Depth to base of fresh water (less than 10,000 mg/l TDS).
- (2) Provide a geologic description of aquifer units with name, age, depth, thickness, lithology, and average total dissolved solids.

II. Well Design and Construction

- 1. Provide data on surface, intermediate, and long string casing and tubing. Data must include material, size, weight, grade, and depth set.
- 2. Provide data on the well cement, such as type/class, additives, amount, and method of emplacement.
- 3. Provide packer data on the packer (if used) such as type, name and model, setting depth, and type of annular fluid used.

4. Provide data on centralizers to include number, type and depth.

5. Provide data on bottom hole completions.

6. Provide data on well stimulation used.

III. Description of Surface Equipment

1. Provide data and a sketch of holding tanks, flow lines, filters, and injection pump.

IV. Monitoring Systems

1. Provide data on recording and nonrecording injection pressure gauges, casing-tubing annulus pressure gauges, injection rate meters, temperature meters, and other meters or gauges.

2. Provide data on constructed monitor wells such as location, depth, casing diameter, method of cementing, etc.

V. Logging and Testing Results

Provide a descriptive report interpreting the results of geophysical logs and other tests. Include a description and data on deviation checks run during drilling.

VI. Provide an as-built diagrammatic sketch of the injection well(s) showing casing, cement, tubing, packer, etc., with proper setting depths. The sketch should include well head and gauges.

VII. Provide data demonstrating mechanical integrity pursuant to 40 CFR 146.08.

VIII. Report on the compatibility of injected wastes with fluids and minerals in both the injection zone and the confining zone.

IX. Report the status of corrective action on defective wells in the area of review.

X. Include the anticipated maximum pressure and flow rate at which injection will operate.

TECHNICAL MEMORANDUM

14 September 2018

File No. 129687-010

TO: Florence Copper Inc.
Ian Ream, Senior Hydrogeologist

FROM: Haley & Aldrich, Inc.
Lauren Candreva, R.G.

Subject: Drilling, Installation, and Integrity Testing Summary
PTF Recovery Well R-07
Florence Copper Inc., Florence, Arizona



This document summarizes the drilling, installation, and testing of Production Test Facility (PTF) recovery well R-07 for Florence Copper Inc. (Florence Copper) in Florence, Arizona, including the equipment used to perform the work, completion, and the results of well testing activities. Separate well completion reports have been created for each PTF well.

The Arizona Department of Water Resources Registry ID for well R-07 is 55-227706; the Well Registry Report is included in Appendix A. Well R-07 is located in the southeast quarter of the northwest quarter of the southwest quarter of Section 28 of Township 4 north, Range 9 East of the Gila and Salt River Baseline and Meridian (D(4-9)28CBD). Well R-07 is located within the Underground Injection Control (UIC) Permitted Area of Review (AOR) for UIC Permit R9UIC-AZ3-FY11-1 and was completed as a Class III recovery well for the PTF (Figure 1).

Florence Copper contracted Hydro Resources, Inc. (Hydro Resources) to drill, install, and test recovery well R-07 in accordance with *Well Specification: Drilling, Installation, and Testing of Class III Injection and Recovery Wells, Production Test Facility, Florence, Arizona* (Haley & Aldrich, Inc. [Haley & Aldrich], 2017). A Challenger 280 drilling rig was used for all drilling and construction activities. Haley & Aldrich provided oversight of drilling activities, geophysical logging, well installation, and testing. All reported depths are in feet below ground surface unless otherwise noted.

I. Geologic Information

1. Lithology and Stratigraphy

A. Geology of Penetrated Units

The geology penetrated during the drilling of the Class III well R-07 is summarized in the table below and a lithologic log is included in Appendix B.

Lithologic Unit Name	Depth to Bottom of Unit (feet)	Thickness of Unit (feet)	Lithology and Age of Unit
Upper Basin Fill Unit (UBFU)	281	281	Alluvium; Quaternary to Tertiary
Middle Fine-Grained Unit (MFGU)	301	20	Alluvium; Tertiary
Lower Basin Fill Unit (LBFU)	370	69	Alluvium; Tertiary to Cretaceous
Bedrock Oxide Unit (Oxide)	Not encountered	>874	Igneous porphyry – Precambrian

B. Description of Injection Unit

Name	Bedrock Oxide Unit
Depth Drilled	1,244 feet
Thickness	>874 feet
Formation Fluid Pressure	Atmospheric plus head of freshwater – no additional formation pressure
Age of Unit	Precambrian with intrusions of Precambrian to Tertiary rocks
Porosity ¹	Approximately 6 to 8.5%
Permeability	Hydraulic Conductivity = 0.56 feet per day
Bottom Hole Temperature	30.1 degrees Celsius
Lithology	Igneous porphyry – quartz monzonite, granodiorite with diabase and andesite dykes (detailed log included in Appendix B)
Bottom Hole Pressure	Approximately 430 pounds per square inch (PSI) (pressure exerted by the column of freshwater with no additional contribution from formation pressure)
Fracture Pressure	0.65 PSI per foot
¹ Porosity values for the bedrock oxide unit are approximate values from calculated neutron porosity values from injection well borehole surveys.	

C. Chemical Characteristics of Formation Fluid

The chemical characteristics of the formation fluid in the injection zone are summarized below and are the results of the sampling of the center PTF wellfield well R-09. The table below summarizes the primary chemical characteristics detected in a formation fluid sample collected on 23 April 2018; the complete analytical report is included in Appendix C.

Analyte	Result (mg/L)
Metals	
Aluminum	<0.08
Antimony	<0.005
Arsenic	0.0016
Barium	0.071
Beryllium	<0.0005
Cadmium	<0.00025
Calcium	140
Chromium	0.0051
Cobalt	<0.00025
Copper	0.011
Iron	<0.30
Lead	<0.0005
Magnesium	27
Manganese	0.002
Mercury	<0.001
Nickel	0.0033
Potassium	6.8
Selenium	<0.0025
Sodium	170
Thallium	<0.0005
Zinc	<0.04
Anions	
Bicarbonate	150
Chloride	310
Fluoride	<0.5
Nitrate	8.8
Sulfate	190
Field Parameters	
Total Dissolved Solids	1,000
pH	7.8
Radiochemicals	
Uranium	0.016
Notes: <i>mg/L = milligrams per liter</i>	

Sampling results for well R-07 are included in the *PTF Mine Block Ambient Groundwater Concentrations and Initial Discharge Characterization of the Underground Workings* (Brown and Caldwell, 2018).

D. Description of Freshwater Aquifers

- 1) The depth to the base of the freshwater aquifer is defined by the interface where deeper formation fluid exhibits a total dissolved solids (TDS) value of 10,000 milligrams per liter (mg/L). The depth of the 10,000 mg/L interface is deeper than all of the wells drilled at the site, and consequently, has not been defined.
- 2) The geologic description of the aquifer units is included below:

Aquifer Unit Name	Age	Depth (feet)	Thickness (feet)	Lithology	Average Total Dissolved Solids ¹ (mg/L)
UBFU	Quaternary/Tertiary	0 to 281	281	Alluvium	914
LBFU	Tertiary	301 to 370	69	Alluvium	754
Notes:					
¹ Average TDS values calculated from UBFU and LBFU monitoring well ambient monitoring results near the PTF.					

II. Well Design and Construction

1. Well R-07 Casing Installed:

Casing	Material	Diameter (inches)	Weight (pounds per foot)	Depth (feet)	Borehole Diameter (inches)	Drilling Method
Surface	Mild Steel	24 O.D. 23½ I.D.	94.71	0 to 40	30	Solid-stem auger
Overburden (intermediate)	Mild Steel – bottom 40 feet poly coated	14 O.D. 13⅓ I.D.	47.36	0 to 500	20	Reverse flooded rotary
Well Casing	Fiberglass Reinforced Plastic	5.47 O.D. 4.74 I.D.	5.40	-1.2 to 523	Inside overburden casing to 500 feet; 12¼	Inside overburden casing/reverse flooded rotary
Screen	PVC SCH80 with 0.080-inch wide slots	5.56 O.D. 4.81 I.D.	4.08	523 to 643 663 to 884 904 to 1,204	12¼	Reverse flooded rotary
Blank Intervals	PVC SCH80	5.56 O.D. 4.81 I.D.	14.75	643 to 663 884 to 904	12¼	Reverse flooded rotary

Notes:

I.D. = inside diameter PVC = polyvinyl chloride
O.D. = outside diameter SCH = Schedule

2. Well Cement

Cement Interval	Cement Type	Additives	Amount Installed (cubic yards)	Method of Emplacement
Surface Casing	Type V Neat 21 sack slurry	None	4.5	Submerged tremie
Overburden Casing	Type V Neat 21 sack slurry	None	26.9	Displacement - installed through drillable grout shoe with one-way stab-in valve, welded to the bottom of the casing
Well Casing	Type V Neat 21 sack slurry	None	18.0	Submerged Tremie

Field forms documenting pipe tallies, annular materials, and cement tickets are included in Appendix D.

3. Annular Packers

No annular packers were used during construction of well R-07.

4. Centralizers

Casing	Centralizer Type	Number and Spacing
Overburden	Mild Steel – welded	12 installed – every 40 feet
Well – FRP and PVC	Stainless steel – Heavy Duty	31 installed – every 40 feet
Notes: <i>FRP = fiberglass reinforced plastic</i> <i>PVC = polyvinyl chloride</i>		

5. Bottom Hole Completion

There is no bottom hole completion as this is not an oil/gas well. The well was completed at the bottom with a stainless-steel endcap of the same diameter as the well screen.

6. Well Stimulation

No well stimulation was used during the drilling and construction of well R-07.

III. Description of Surface Equipment

1. Surface Equipment

Well R-07 is a recovery well and has been equipped with a submersible pump. The 2-inch diameter discharge pipe extends from the well head and into the manifold that conveys the fluid directly to the solvent extraction/electrowinning plant on-site. A diagram of the wellhead is included as Figure 2.

IV. Monitoring Systems

1. Well Monitoring Equipment

Equipment Type	Location	Type	Purpose
Annular Pressure Transducer	Well Annulus – 635 feet bgs	Recording	Monitor water column/pressure
Pressure Transducer	Well Casing – approx. 400 feet bgs	Recording	Monitor water column/pressure
Flow Meter	Wellhead	Recording	Monitor extraction rate
Pressure Gauge	Wellhead	Nonrecording	Monitor wellhead pressure

2. Monitoring Wells

There are a total of 16 monitoring wells associated with the PTF: 7 point-of-compliance (POC) wells, 7 United States Environmental Protection Agency (USEPA) supplemental monitoring wells, and 2 operational monitoring wells. The POC wells are located outside the AOR and are not constructed as Class III wells. The supplemental monitoring and operational monitoring wells are located within the AOR and are constructed as Class III wells as required by the UIC Permit. The wells are summarized in the tables below by type.

POC Wells						
Well ID	Location X/Y (State Plane NAD 83)	Depth (feet)	Well Nom. Diameter (inches)	Cementing Method	Screened Interval (feet)	Screened Lithologic Unit
M14-GL	846750.23 746461.52	859	5 9/16 OD	Submerged tremie	778 to 838	LBFU
M15-GU	846697.17 746464.82	615	5 9/16 OD	Submerged tremie	554 to 594	LBFU
M22-O	846751.26 746514.47	1,140	5 9/16 OD to 528 feet; 4 1/2 OD to 1,140 feet	Submerged tremie	932 to 1,130	Oxide

POC Wells						
Well ID	Location X/Y (State Plane NAD 83)	Depth (feet)	Well Nom. Diameter (inches)	Cementing Method	Screened Interval (feet)	Screened Lithologic Unit
M23-UBF	846688.13 746512.48	250	6 5/8 OD	Submerged tremie	210 to 250	UBFU
M52-UBF	851092.00 774178.00	274	5 9/16	Submerged tremie	198 to 273	UBFU
M54-LBF	847331.96 746682.61	630	5 9/16	Submerged tremie	310 to 629	LBFU
M54-O	847342.99 746702.36	1,199	5 9/16	Submerged tremie	668 to 1,198	Oxide

OD = outside diameter

Supplemental Monitoring Wells						
Well ID	Location X/Y (State Plane NAD 83)	Depth (feet)	Well Nom. Diameter (inches)	Cementing Method	Screened Interval (feet)	Screened Lithologic Unit
M55-UBF	847541.46 746280.63	261	5	Submerged tremie	240 to 260	UBFU
M56-LBF	847518.70 746303.41	340	5	Submerged tremie	320 to 340	LBFU
M57-O	847378.37 746248.93	1,200	5	Submerged tremie	523 to 1,199	Oxide
M58-O	847672.23 746595.97	1,200	5	Submerged tremie	594 to 1,199	Oxide
M59-O	847934.95 746218.89	1,201	5	Submerged tremie	534 to 1,199	Oxide
M60-O	847599.37 745903.70	1,201	5	Submerged tremie	444 to 1,200	Oxide
M61-LBF	848184.46 746148.88	629	5	Submerged tremie	429 to 629	LBFU

Operational Monitoring Wells						
Well ID	Location X/Y (State Plane NAD 83)	Depth (feet)	Well Nom. Diameter (inches)	Cementing Method	Screened Interval	Screened Lithologic Unit
MW-01-LBF	847487.97 746360.54	444	5	Submerged tremie	330 to 440	LBFU
MW-01-O	847499.04 746369.31	1,200	5	Submerged tremie	500 to 1,200	Oxide

V. Logging and Testing Results

Borehole geophysical logging was conducted on well R-07 in four phases: 1) open-hole surveys in the 20-inch borehole prior to installation of the overburden casing; 2) cased-hole surveys in the 14-inch casing; 3) open-hole surveys in the 12.25-inch borehole prior to installation of the well casing and screen; and 4) cased-hole surveys in the completed well.

The open-hole geophysical surveys completed at well R-07 included:

- Spontaneous potential;
- Natural gamma;
- Electrical resistivity (short and long normal);
- Caliper with calculated volume;
- Temperature;
- Sonic; and
- Deviation.

The cased-hole geophysical surveys completed included:

- Cement bond log (overburden steel casing);
- Sonic (for cement bond with fiberglass reinforced plastic [FRP]);
- 4 Pi Density (for cement bond with FRP);
- Dual Density (for cement bond with FRP);
- Natural Gamma;
- Fluid Conductivity;
- Temperature;
- Gyroscopic Deviation Survey; and
- Video Survey.

Open-hole geophysical surveys were used to support identification of the lithologic contacts, to evaluate the condition of the borehole, and to evaluate the deviation of the borehole.

The primary logs used to evaluate lithologic contacts are natural gamma ray, short (16-inch) and long (64-inch) normal electrical resistance, and single-point resistance. The lithologic contacts for the Middle Fine-Grained Unit (MFGU) were selected based on the short and long resistance and the single-point resistance. All the resistivity logs decreased and stayed consistently low through the MFGU. This contact is generally a relatively sharp decrease in resistance at the top of the unit and a gradual increase in resistance below the bottom of the unit.

The contact between the Lower Basin Fill Unit (LBFU) and the bedrock was identified primarily with natural gamma and correlated with the resistance logs. There is a consistent increase in gamma at the contact between the LBFU and the bedrock that had been identified and documented at the site during exploration in the 1990s. For well R-07, the gamma is consistently at approximately 50 to 55 American Petroleum Institute (API) units throughout the Upper Basin Fill Unit (UBFU) and MFGU, a slight increase to approximately 60 API units in the LBFU, and an increase beginning at approximately 370 feet to over 80 API units. After the increase at 370 feet, the natural gamma begins to vary more than it did in the alluvial units. This contact was also verified with the drilled cuttings. This change in the response of the natural gamma indicates the contact with the bedrock unit. Also, at this approximate depth the resistance increases which is likely due to bedrock containing less water causing a generally increased resistivity.

Cased-hole geophysical surveys were conducted to evaluate the cement seal and casing-cement bond, to document baseline fluid temperature and conductivity, and to evaluate the plumbness of the well. The cement-bond is discussed in Section VII.

Copies of all the open-hole geophysical logs and cased-hole temperature, fluid conductivity, and natural gamma are included in Appendix E; a figure summarizing the open-hole logs used to evaluate geology is included as Figure 3. The cased-hole logs used to evaluate cement bond are included in Appendix F.

VI. Well As-Built Diagram

A diagram showing the wellhead completion for well R-07 is included as Figure 2. A well as-built diagram for well R-07 is included as Figure 4.

VII. Demonstration of Mechanical Integrity

A demonstration of Part I mechanical integrity of the well was completed using a standard annular pressure test (SAPT) in accordance with Part II.E.3.a.i.A of the UIC Permit. Mechanical integrity will be demonstrated every 2 years during operations and will be confirmed by daily injection pressure monitoring that will be conducted per the UIC Permit once the well is operational. Well R-07 SAPT is summarized below.

The mechanical integrity of the blank well casing was tested by performing a SAPT on 2 February 2018. The SAPT was conducted by installing an inflatable straddle packer assembly in the well. The bottom packer was installed near the bottom of the FRP-cased portion of the well and the top packer was near the surface, the packers were inflated to form a seal against the casing. The bottom 5 feet of the packer drop pipe was perforated to allow for communication between the tubing and the annulus of the packer assembly. The drop pipe extended through the wellhead and a high pressure/low volume pump was attached to the drop pipe to pressurize the test interval. A valve on the drop pipe at the surface was used to isolate the test interval once the planned test pressure was achieved.

An In-Situ LevelTROLL® pressure transducer with a data logger was installed at the well head and was connected to the packer assembly annulus interval via a National Pipe Thread adapter. The LevelTROLL was used to monitor and record pressure inside the well during the SAPT. To conduct the SAPT, water was pumped from a nearby well immediately prior to testing. Before the water was pumped into the test well, the water temperature was measured to ensure that it was similar to the ambient groundwater temperature of the test well to reduce the potential of differential temperature effects on the well casing. The SAPT for the Class III well was conducted by applying hydraulic pressure to well casing and shutting in pressure between the packer and wellhead assembly, monitoring the shut-in pressure for a 30-minute period, then measuring the volume of water returned from the well casing after the pressure was released.

On 2 February 2018, the packer was installed to approximately 504 feet and the SAPT was conducted successfully three times. The USEPA SAPT form, a table of the data, and a chart of the data is provided in Appendix G.

Part II mechanical integrity is demonstrated by the cementing records included in this report (in accordance with Part II.E.3.ii.C of the UIC Permit) and will be demonstrated during operations by annular conductivity monitoring on the observation and multi-level sampling wells (in accordance with Part II.E.3.a.ii.A of the UIC Permit).

Cemented Interval	Cement Type	Calculated Grout Volume (cubic yards)	Installed Grout Volume (cubic yards)
Surface Casing	Type V 21 sack neat cement slurry	2.6	4.5
Overburden Casing	Type V 21 sack neat cement slurry	22.0	26.9
Well Casing	Type V 21 sack neat cement slurry	16.8	18.0

On 27 November 2017, a cement bond log was run on the overburden casing. On 1 February 2018, a suite of logs was run over the entire length of the completed well to verify the grout seal; a summary of the logs completed to demonstrate cement bond are included in Appendix F.

The cement bond of the steel casing was evaluated by the geophysical contractor by calculating a bond index. The bond index was calculated to be an average of 81 percent at well R-07 over the cement grouted interval from 1 to 500 feet; this data is included on the summary log in Appendix G. A sonic log was also run in the steel casing and the sonic data indicate a consistent density in the steel cased cemented interval of well R-07, which supports the cement bond log data.

There is not a bond log tool designed to evaluate cement bond with FRP casing, so the cement interval with the FRP casing at well R-07 was evaluated using density logs. The logs conducted include sonic, focused density, and 4pi density logs. The measured density of the cased interval at R-07 indicate there are no significant cement deficiencies from the approximately 227 feet (static water Level) to 500 feet, and no significant cement deficiencies were noted in the 4pi density data collected from 15 to 500 feet. There were some very localized, relatively low density intervals identified in the density logs but they were insignificant, only extending 2 to 4 feet. A summary of the FRP cased data is included in the well completion summary for R-07 in Appendix G.

VIII. Compatibility of Injected Waste

The Florence Copper Project is a Class III mineral extraction project and does not include the injection of any waste products of any kind. The injected fluid (lixiviant) is a carefully constituted in-situ copper recovery solution that will be recovered and recycled following injection.

The compatibility of the lixiviant was evaluated as part of the geochemical modeling completed by Florence Copper and summarized in the *Geochemical Evaluation to Forecast Composition of Process Solutions for In-Situ Copper Recovery Pilot Test Facility at Florence Copper, Florence Arizona* (Daniel B. Stephens Inc., 2014) which was included in Attachment H of the UIC Permit Application.

IX. Status of Corrective Action on Defective Wells in the Area of Review

There are not currently any defective wells in the AOR.

X. Maximum Pressures and Flow Rates for R-07

Maximum Operating Pressure	Maximum Flow (Extraction)
Atmospheric	No maximum extraction flow

This well is a recovery well used to extract solution; there is no maximum flow. However, in accordance with Section 2.2.1.1 of the Aquifer Protection Permit (APP), the recovery rate for the entire wellfield must always exceed the injection rate on a daily average, and in accordance with Part II.E.5.a of the UIC Permit the recovery rate will not fall below 110 percent of the injection rate on a daily average.

XI. Well Development

Well R-07 was developed by the airlift method, followed by pumping, and was completed by Hydro Resources using a workover rig. To purge drilling fluids and solids, the well was air-lift developed at various depths ranging from approximately 400 to 1,150 feet. During development, the airlift pump was turned on and off to surge the well. Airlift development started on 19 January 2018 and was conducted over a period of 5 days. On 21 January 2018, approximately 33 gallons of chlorine was added to the well. The discharge was relatively clear and sand-free at the end of the airlift development period.

On 25 January 2018, a submersible pump was temporarily installed to approximately 1,176 feet to pump develop the well. Prior to pumping, the static water level was measured at approximately 228 feet. Pump development was conducted at approximately 70 gallons per minute (gpm) over a period of 2 days (25 to 26 February 2018), during which time the submersible pump was periodically turned off to surge the well. The discharge was visually clear throughout the pump development period, with turbidity values less than 5 Nephelometric Turbidity Unit at the end of the development period. Well development forms are included in Appendix H.

XII. Well Completion

A well video survey was conducted on 7 February 2018; the video log report is included as Appendix I. The video log depths are presented in feet below the top of the casing and thus vary slightly from what is recorded; however, these values are the same with the correction for stick up.

The video log indicates the total depth reached was 1,156 feet; the bottom of the well was airlifted on 24 January 2018 down to 1,198 feet.

A gyroscopic survey was also conducted on the completed well on 7 February 2018; the results are included in Appendix I.

The surveyed location for well R-07 is:

Northing (feet)	Easting (feet)	Measuring Point Elevation (feet amsl)
746131.57	847552.95	1478.66

Notes:
*Northing and easting locations provided in State Plane North American Datum 1983,
vertical location provided in North American Vertical Datum 1988.
amsl – feet above mean sea level*

XIII. Downhole Equipment

On 25 June 2018, the permanent pump equipment was installed in the well. The equipment installed included the following:

- Wilo 7.5 horsepower, 40-gpm pump – intake at 812 feet;
- 2-inch Schedule 120 threaded and coupled polyvinyl column pipe with 316L stainless steel couplers from the pump to approximately 500 feet;
- 2-inch Schedule 40 threaded and coupled 316L stainless steel column pipe with 316L stainless steel couplers from approximately 500 feet to the wellhead;
- 316L braided stainless steel safety cable was installed from the pump to the wellhead;
- Pressure transducer; and
- 1-inch nominal diameter sounding tube.

The type and depth of equipment installed in each well is not constrained by the UIC Permit or the APP. This information is provided in accordance with Section 2.7.4.3 of the APP. Operational consideration may require that the type and depth of equipment may need to be changed in response to conditions observed during operations.

XIV. References

Brown and Caldwell, Inc., 2018. *PTF Mine Block Ambient Groundwater Concentrations and Initial Discharge Characterization of the Underground Workings*. Prepared for Florence Copper. August.

Daniel B. Stephens, Inc., 2014. *Geochemical Evaluation to Forecast Composition of Process Solutions for In-Situ Copper Recovery Pilot Test Facility at Florence Copper, Florence Arizona*. Prepared for Florence Copper. May.

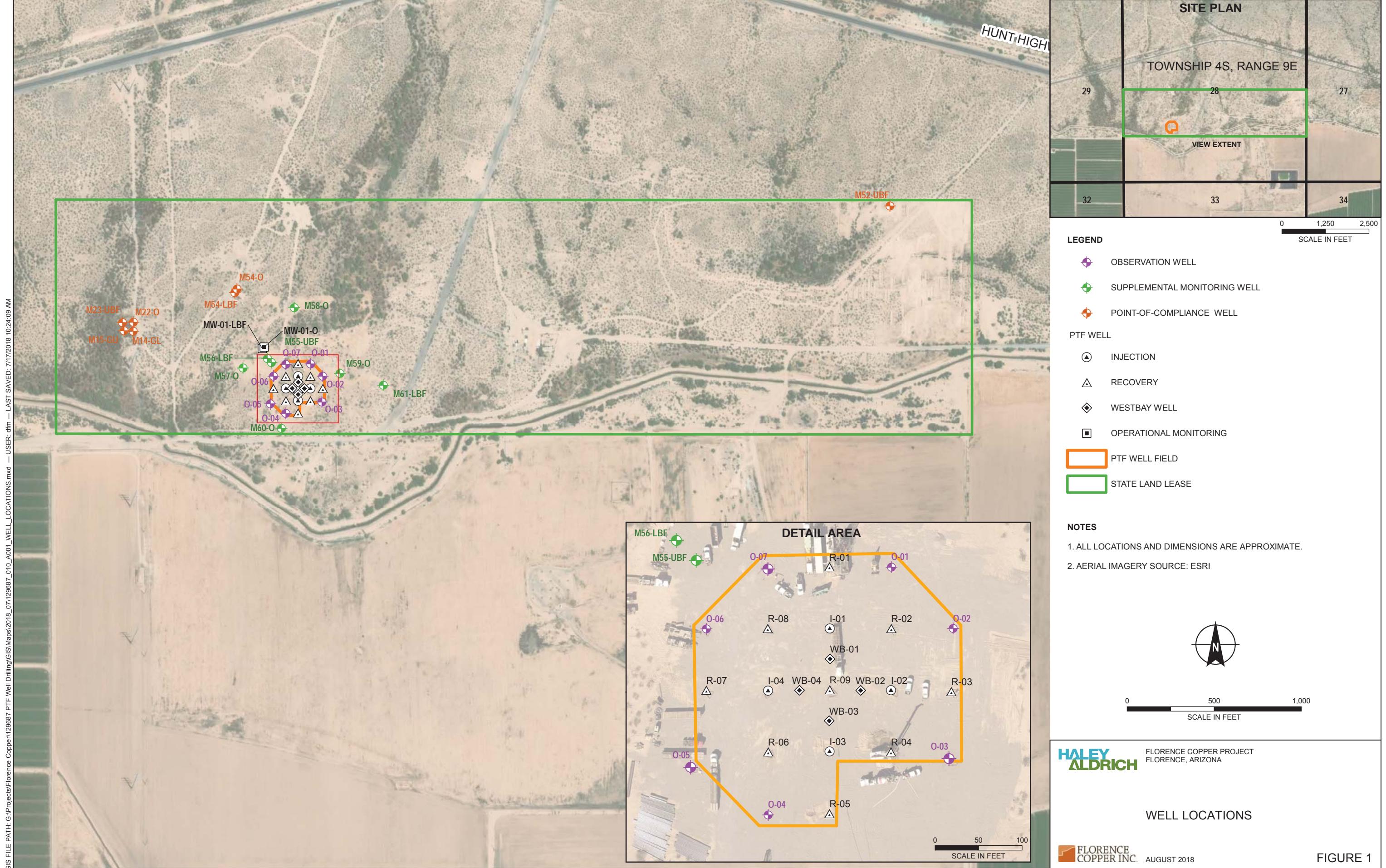
Haley & Aldrich, Inc., 2017. *Well Specification: Drilling, Installation, and Testing of Class III Injection and Recovery Wells, Production Test Facility, Florence, Arizona*. Revised September 2017.

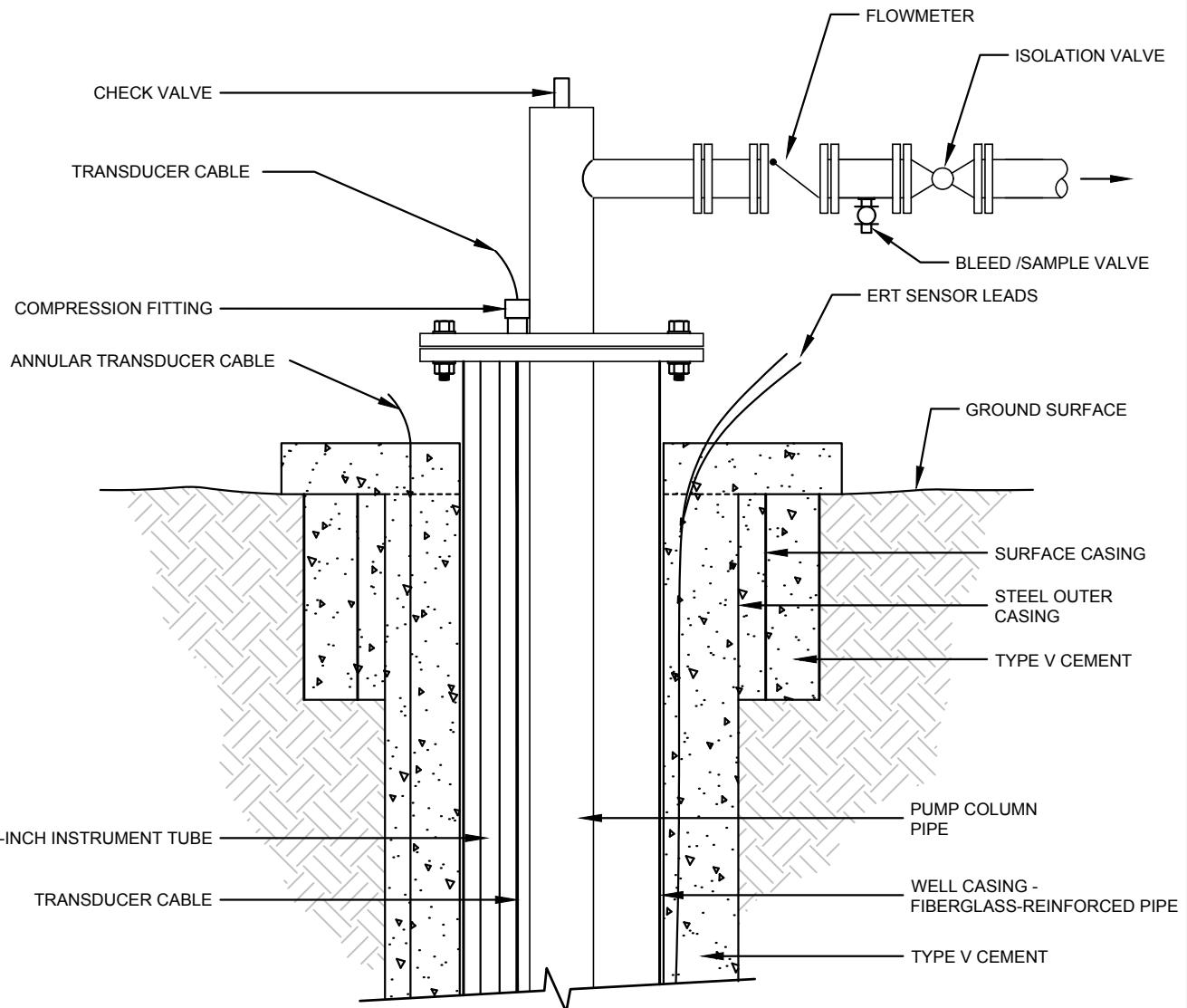
Enclosures:

- Figure 1 – Well Locations
- Figure 2 – Recovery Well Head Detail
- Figure 3 – Geophysical Data and Lithologic Log
- Figure 4 – Well R-07 As-Built Diagram
- Appendix A – Arizona Department of Water Resources Well Registry Report
- Appendix B – Lithologic Log
- Appendix C – Chemical Characteristics of Formation Water
- Appendix D – Well Completion Documentation
- Appendix E –Geophysical Logs
- Appendix F – Cement Bond Log Summary
- Appendix G – SAPT Documentation
- Appendix H – Well Development Field Forms
- Appendix I – Well Video Log and Gyroscopic Survey Reports

G:\Projects\Florence Copper\129687 PTF Well Drilling\Deliverables\Well Summary Reports\R-07\2018-0914_R-07 Well Install Comp Letter Report_EPA vers_F.docx

FIGURES





NOTES

1. ERT - ELECTRICAL RESISTIVITY TOMOGRAPHY

**HALEY
ALDRICH**

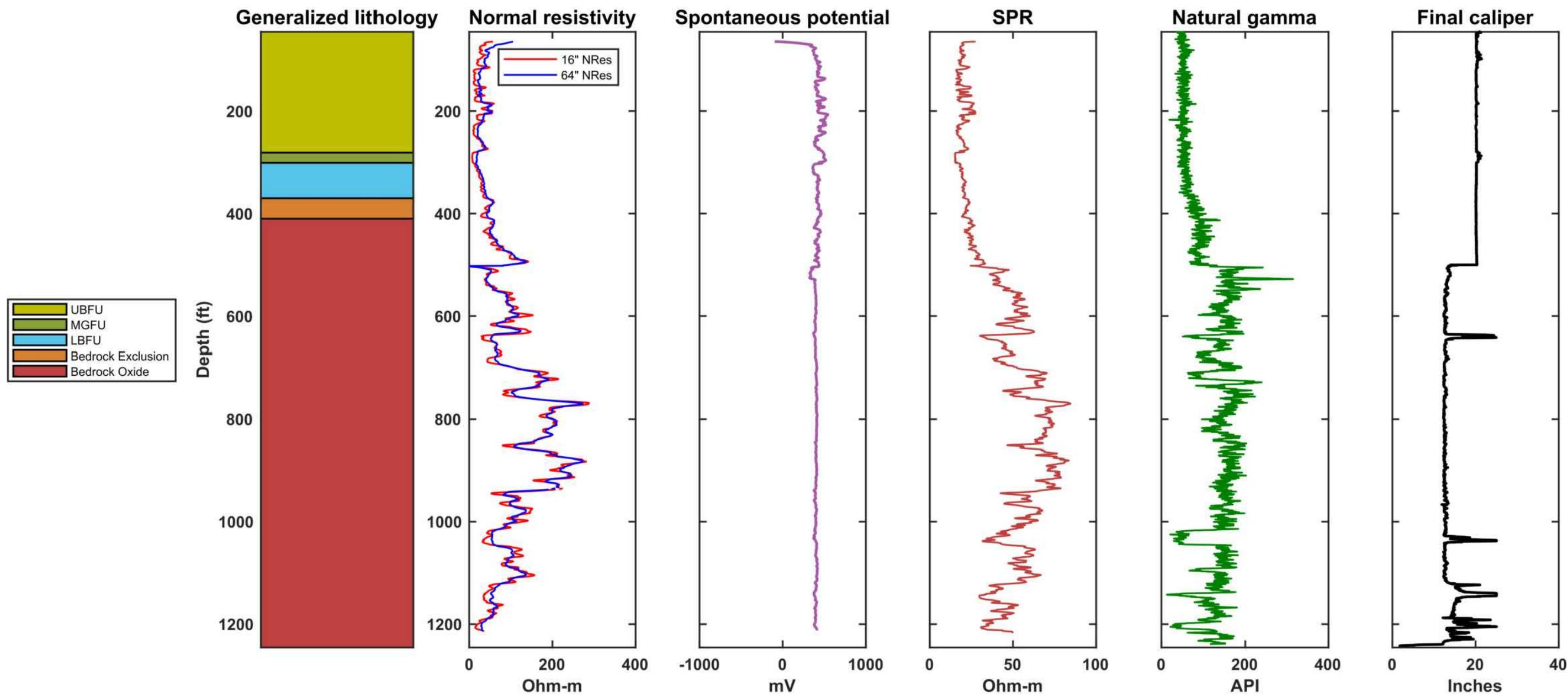
PRODUCTION TEST FACILITY
FLORENCE COPPER, INC.
FLORENCE, ARIZONA

RECOVERY WELL HEAD
DETAIL

 FLORENCE
COPPER INC.

SCALE: NOT TO SCALE
SEPTEMBER 2018

FIGURE 2



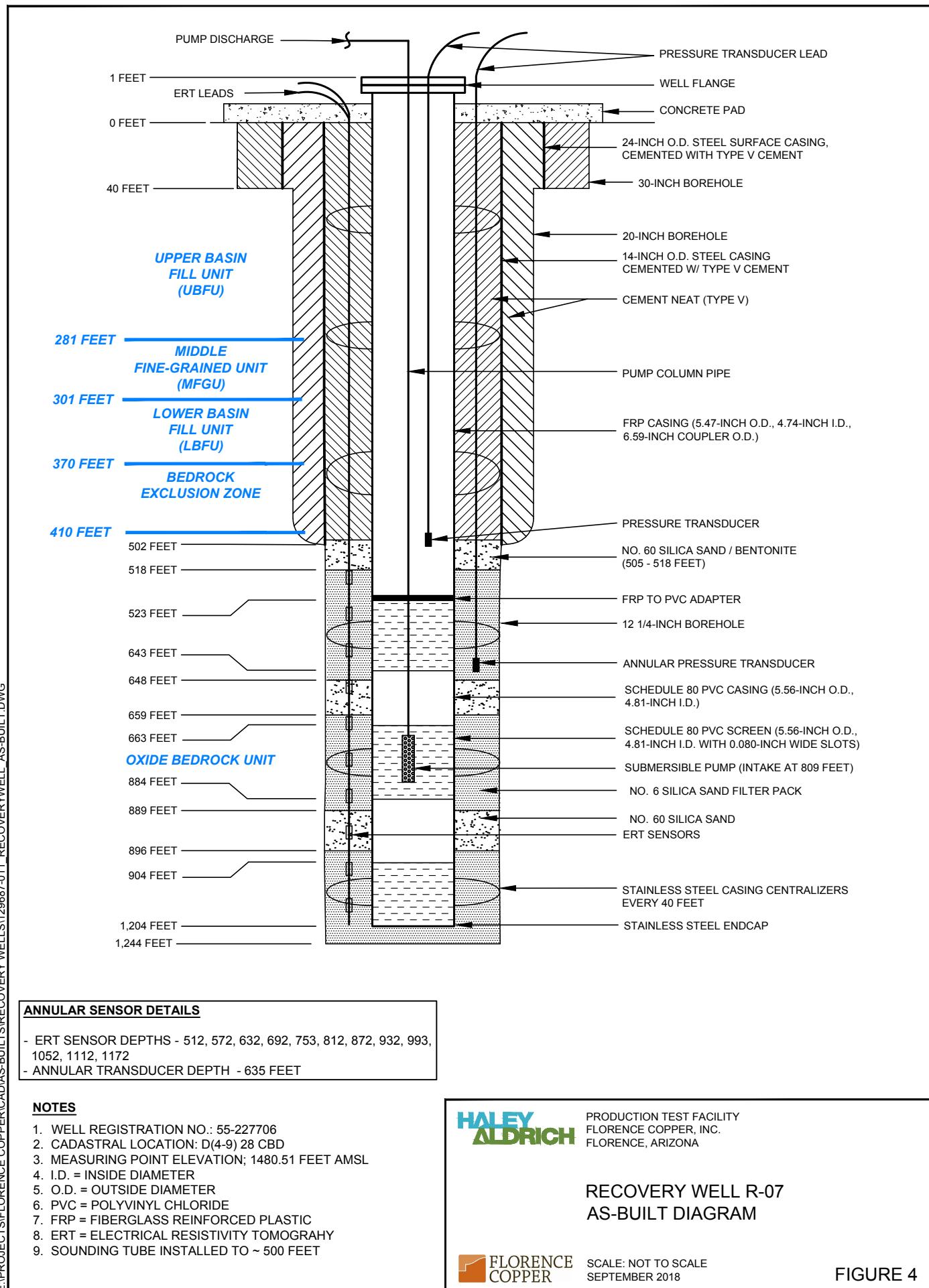
PRODUCTION TEST FACILITY
FLORENCE COPPER, INC.
FLORENCE, ARIZONA

RECOVERY WELL R-07
GEOPHYSICAL DATA AND
LITHOLOGIC LOG



SCALE: AS SHOWN
SEPTEMBER 2018

FIGURE 3



APPENDIX A

Arizona Department of Water Resources Well Registry Report

 Arizona Department of Water Resources Water Management Division P.O. Box 36020 Phoenix, Arizona 85067-6020 (602) 771-8627 • (602) 771-8690 fax www.azwater.gov	RECEIVED Well Driller Report <i>AUG 20 2018</i> and Well Log CJ ADWR
--	--

THIS REPORT MUST BE FILED WITHIN **30 DAYS** OF COMPLETING THE WELL.

PLEASE PRINT CLEARLY USING BLACK OR BLUE INK.

FILE NUMBER
D (4-9) 28 CBD
WELL REGISTRATION NUMBER
55 - 227706
PERMIT NUMBER (IF ISSUED)

SECTION 1. DRILLING AUTHORIZATION

Drilling Firm

Mail To:	NAME	DWR LICENSE NUMBER				
	Hydro Resources Inc.	816				
	ADDRESS 13027 County Rd. 18 Unit C	TELEPHONE NUMBER (303) 857-7544				
CITY / STATE / ZIP Ft. Lupton, CO 80621	FAX (303) 857-2826					

SECTION 2. REGISTRY INFORMATION

Well Owner	Location of Well					
FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL Florence Copper Inc.	WELL LOCATION ADDRESS (IF ANY)					
MAILING ADDRESS 1575 W. Hunt Hwy	TOWNSHIP (N/S) 4S	RANGE (E/W) 9E	SECTION 28	160 ACRE SW ¼	40 ACRE NW ¼	10 ACRE SE ¼
CITY / STATE / ZIP CODE Florence, AZ 85132	LATITUDE 33 ° 3' 0.72 "N	Minutes Degrees	Seconds Seconds	LONGITUDE -111 ° 26' 6.34 "W	Minutes Degrees	Seconds Seconds
CONTACT PERSON NAME AND TITLE Ian Ream - Sr. Hydrologist	METHOD OF LATITUDE/LONGITUDE (CHECK ONE) <input checked="" type="checkbox"/> *GPS: Hand-Held <input type="checkbox"/> *GPS: Survey-Grade					
TELEPHONE NUMBER (520) 374-3984	LAND SURFACE ELEVATION AT WELL 1492 Feet Above Sea Level					
WELL NAME (e.g., MW-1, PZ-3, Lot 25 Well, Smith Well, etc.) R - 07	METHOD OF ELEVATION (CHECK ONE) <input checked="" type="checkbox"/> *GPS: Hand-Held <input type="checkbox"/> *GPS: Survey-Grade					
	*GEOGRAPHIC COORDINATE DATUM (CHECK ONE) <input checked="" type="checkbox"/> NAD-83 <input type="checkbox"/> Other (please specify):					
	COUNTY PINAL	ASSESSOR'S PARCEL ID NUMBER BOOK MAP PARCEL				

SECTION 3. WELL CONSTRUCTION DETAILS

Drill Method	Method of Well Development	Method of Sealing at Reduction Points
CHECK ALL THAT APPLY <input type="checkbox"/> Air Rotary <input type="checkbox"/> Bored or Augered <input type="checkbox"/> Cable Tool <input type="checkbox"/> Dual Rotary <input checked="" type="checkbox"/> Mud Rotary <input checked="" type="checkbox"/> Reverse Circulation <input type="checkbox"/> Driven <input type="checkbox"/> Jetted <input type="checkbox"/> Air Percussion / Odex Tubing <input type="checkbox"/> Other (please specify):	CHECK ALL THAT APPLY <input checked="" type="checkbox"/> Airlift <input type="checkbox"/> Bail <input type="checkbox"/> Surge Block <input checked="" type="checkbox"/> Surge Pump <input type="checkbox"/> Other (please specify):	CHECK ONE <input type="checkbox"/> None <input type="checkbox"/> Packed <input type="checkbox"/> Wedged <input type="checkbox"/> Welded <input type="checkbox"/> Other (please specify):
	Condition of Well	Construction Dates
	CHECK ONE <input checked="" type="checkbox"/> Capped <input type="checkbox"/> Pump Installed	DATE WELL CONSTRUCTION STARTED 12/27/2017
		DATE WELL CONSTRUCTION COMPLETED 05/24/2018

I state that this notice is filed in compliance with A.R.S. § 45-596 and is complete and correct to the best of my knowledge and belief.

SIGNATURE OF QUALIFYING PARTY

DATE

5/24/2018

Well Driller Report and Well Log

 WELL REGISTRATION NUMBER
55 - 227706
SECTION 4. WELL CONSTRUCTION DESIGN (AS BUILT) (attach additional page if needed)
Depth

DEPTH OF BORING	1244	Feet Below Land Surface	DEPTH OF COMPLETED WELL	1205	Feet Below Land Surface
-----------------	------	-------------------------	-------------------------	------	-------------------------

Water Level Information

STATIC WATER LEVEL	229	Feet Below Land Surface	DATE MEASURED	03/01/2018	TIME MEASURED	1 PM	IF FLOWING WELL, METHOD OF FLOW REGULATION
							<input type="checkbox"/> Valve <input type="checkbox"/> Other:

Borehole			Installed Casing											
DEPTH FROM SURFACE		BOREHOLE DIAMETER (inches)	DEPTH FROM SURFACE		OUTER DIAMETER (inches)	MATERIAL TYPE (T)			PERFORATION TYPE (T)			SLOT SIZE IF ANY (inches)		
FROM (feet)	TO (feet)		FROM (feet)	TO (feet)		STEEL	PVC	ABS	IF OTHER TYPE, DESCRIBE	BLANK OR NONE	WIRE WRAP	MILLS KNIFE	SLOTTED	IF OTHER TYPE, DESCRIBE
0	40	30	0	40	24.5	X				X				
40	513	20	0	513	14.5	X				X				
513	1244	12.25	0	523	5.44				FRP	X				
			523	643	5.56	X						X	.080	
			643	663	5.56	X				X				
			663	884	5.56	X						X	.080	
			884	904	5.56	X				X				
			904	1205	5.56	X						X	.080	

Installed Annular Material															
DEPTH FROM SURFACE		ANNULAR MATERIAL TYPE (T)										FILTER PACK			
FROM (feet)	TO (feet)	NONE	CONCRETE	NEAT CEMENT OR CEMENT GROUT	CEMENT-BENTONITE GROUT	BENTONITE			IF OTHER TYPE OF ANNULAR MATERIAL, DESCRIBE				SAND	GRAVEL	SIZE
						GROUT	CHIPS	PELLETS							
0	40		X												
0	513		X												
513	518					X									
518	648													X	6-9
648	658						X								
658	888												X	6-9	
888	896							X							
896	1244												X	6-9	

Well Driller Report and Well Log

WELL REGISTRATION NUMBER

55 - 227706

SECTION 5. GEOLOGIC LOG OF WELL

Well Driller Report and Well Log

WELL REGISTRATION NUMBER

55 - 227706**SECTION 6. WELL SITE PLAN**

NAME OF WELL OWNER

Florence Copper Inc.

COUNTY ASSESSOR'S PARCEL ID NUMBER

BOOK

MAP

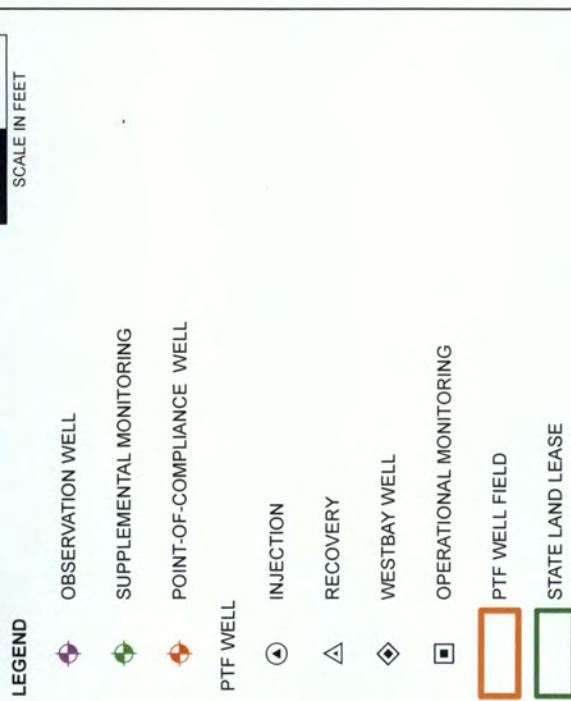
PARCEL

- ❖ Please draw the following: (1) the boundaries of property on which the well was located; (2) the well location; (3) the locations of all septic tank systems and sewer systems on the property or within 100 feet of the well location, even if on neighboring properties; and (4) any permanent structures on the property that may aid in locating the well.
- ❖ Please indicate the distance between the well location and any septic tank system or sewer system.



1" = _____ ft

SEE ATTACHED MAP

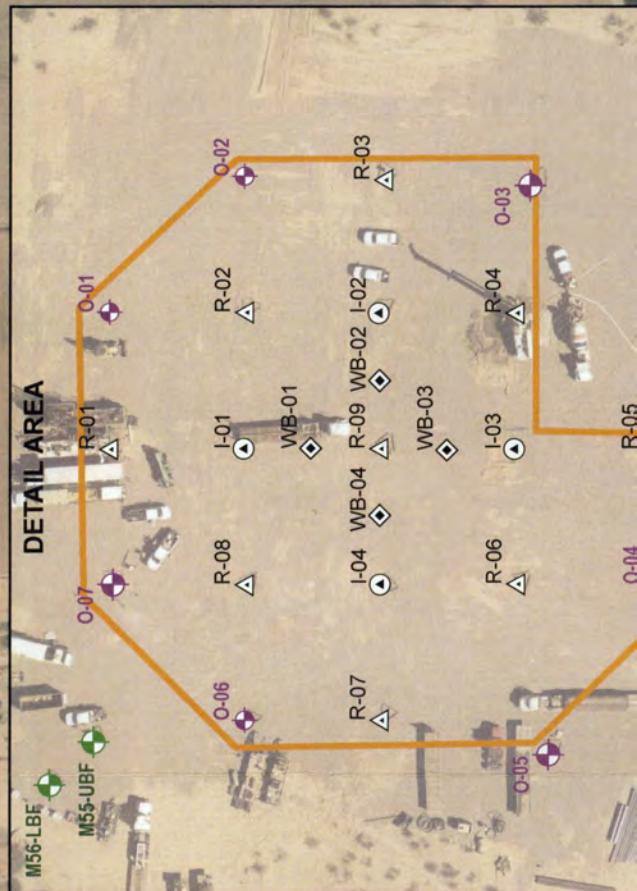
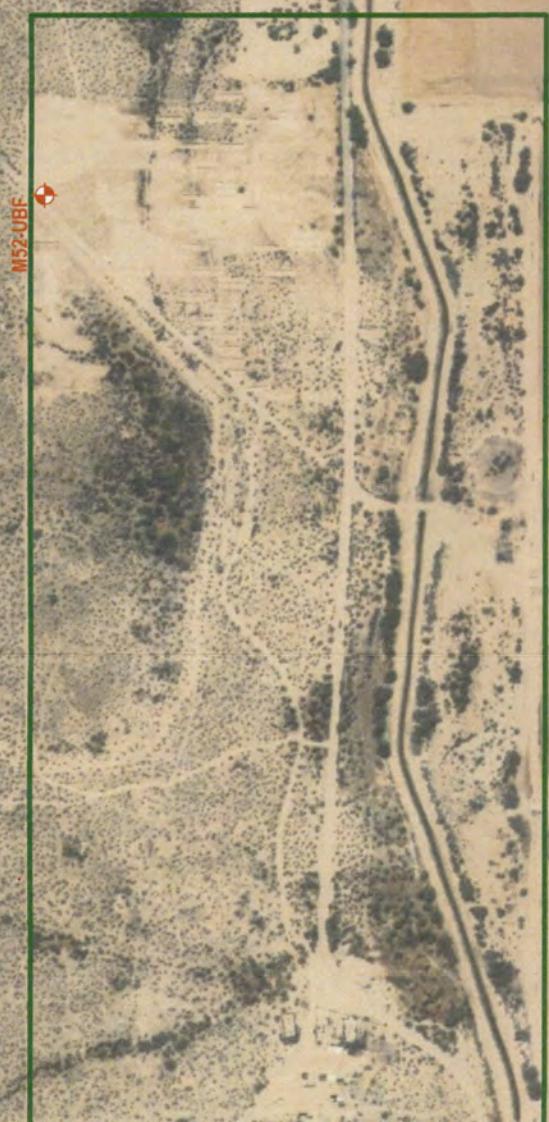


NOTES

- ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
- AERIAL IMAGERY SOURCE: ESRI



HALEY ALDRICH
FLORENCE COPPER PROJECT
FLORENCE, ARIZONA



Run Date: 09/07/2017

AZ DEPARTMENT OF WATER RESOURCES

WELL REGISTRY REPORT - WELLS55

Location D 4.0 9.0 28 C B D Well Reg.No 55 - 227706 AMA PINAL AMA

Registered Name FLORENCE COPPER INC File Type NEW WELLS (INTENTS OR APPLICATIONS)
1575 W HUNT HWY Application/Issue Date 08/21/2017

FLORENCE AZ 85132

Owner OWNER Well Type NON-EXEMPT
Driller No. 816 SubBasin ELOY
Driller Name HYDRO RESOURCES - ROCKY MOUNTAIN, INC. Watershed UPPER GILA RIVER
Driller Phone 303-857-7540 Registered Water Uses INDUSTRIAL
County PINAL Registered Well Uses WATER PRODUCTION
Discharge Method NO DISCHARGE METHOD LISTED
Intended Capacity GPM 0.00 Power NO POWER CODE LISTED

Well Depth	0.00	Case Diam	0.00	Tested Cap	0.00
Pump Cap.	0.00	Case Depth	0.00	CRT	
Draw Down	0.00	Water Level	0.00	Log	
		Acres Irrig	0.00	Finish	NO CASING CODE LISTED

Contamination Site: NO - NOT IN ANY REMEDIAL ACTION SITE

Tribe: Not in a tribal zone

Comments R-07



55-227706

Current Action

9/1/2017 550 DRILLING AUTHORITY ISSUED
Action Comment: sm

Action History

9/1/2017 867 APP/NOI HYDRO/WATER QUALITY REVIEW COMPLETE
Action Comment: pw
9/1/2017 555 DRILLER & OWNER PACKETS MAILED
Action Comment: sm
8/28/2017 866 APP/NOI SENT TO HYDRO/WATER QUALITY REVIEW
Action Comment: sm
8/21/2017 150 NOI RECEIVED FOR A NEW PRODUCTION WELL
Action Comment: sm

**ARIZONA DEPARTMENT OF WATER RESOURCES
GROUNDWATER PERMITTING AND WELLS UNIT
1110 Washington St., Suite 310, Phoenix, AZ 85007-2952**

THIS AUTHORIZATION SHALL BE IN THE POSSESSION OF THE DRILLER DURING ALL DRILL OPERATIONS

WELL R-07

WELL REGISTRATION NO: 55-227706

AUTHORIZED DRILLER: HYDRO RESOURCES

LICENSE NO: 816

A NOTICE OF INTENTION TO DRILL A NON-EXEMPT WELL INSIDE THE PHOENIX ACTIVE MANAGEMENT AREA HAS BEEN GRANTED TO:

WELL OWNER: FLORENCE COOPER, INC. 1575 W HUNT HWY FLORENCE, AZ 85132

The well(s) is/are to be located in the:

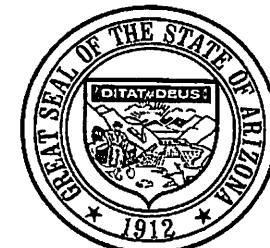
SE $\frac{1}{4}$ of the NW $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Section 28, Township 4 South, Range 9 East

No. of well(s) in this project: 1

THIS AUTHORIZATION EXPIRES AT MIDNIGHT ON THE 22TH DAY OF AUGUST, 2018.

Stella Muriel
GROUNDWATER PERMITTING AND WELLS UNIT

**THE DRILLER MUST FILE A LOG OF THE WELL
WITHIN 30 DAYS OF COMPLETION OF DRILLING**





DOUGLAS A. DUCEY
Governor

THOMAS BUSCHATZKE
Director

ARIZONA DEPARTMENT of WATER RESOURCES
1110 W. Washington St., Suite 310
Phoenix, Arizona 85007-2952
602.771.8500
azwater.gov

September 1, 2017

Ian Ream
Florence Copper, Inc.
1575 W. Hunt Hwy
Florence, AZ 85132

RE: Notice of Intention to Modify an Existing Non-Exempt Well
Well Registration No. 55-227700 thru 55-227708
File No. D (4-9) 28 CCA & CCD

Dear Mr. Ream:

The Notice of Intention to Modify an Existing Non-Exempt Well inside the Pinal Active Management Area has been approved. A copy of the Notice is enclosed for your records. The drilling card for the modification of the above referenced well has been forwarded to your well driller.

Within 30 days of completion of the well, the well driller is required to furnish this Department with a complete and accurate log of the well. In addition, the well owner is required to submit the enclosed Completion Report within 30 days of installation of pump equipment.

Pursuant to the provisions of A.R.S. § 45-604, any person withdrawing groundwater from a well is required to use a water measuring device to record rates of withdrawal in order to provide or allow the computation of an annual volume of pumpage from the well. The total volume of pumpage shall be reported on an annual report. The annual report shall be submitted no later than March 31 following the end of each completed annual reporting period. The first annual report period shall be from the date of this permit through December 31, 2017.

The Department has issued the authorization to modify this well pursuant to A.R.S. §§ 45-596 and 45-597 of the Groundwater Code. The legal nature of the water withdrawn from the well may be the

Florence Cooper Inc.

September 1, 2017

Re: Notice of Intention to Drill a Non-Exempt Well

Page 2

subject of court action in the future as part of a determination of surface water rights in your area. If there are court proceedings that could affect your well, you will be notified and be given the opportunity to participate.

Under A.R.S. § 45-593, the person to whom a well is registered must notify the Department of a change in ownership, physical characteristics or any other data about the well in order to keep the well registration records current and accurate. Forms may be obtained by contacting the Department, or online at <http://www.azwater.gov>

If you have any questions about the terms and conditions of the permit or require any administrative corrections to this permit, please contact the Groundwater Permitting Wells Unit at (602) 771-8527.

Sincerely,



Stella Murillo, Manager
Groundwater Permitting and Wells Section

Enclosures

R-07

**ARIZONA DEPARTMENT OF WATER RESOURCES
GROUNDWATER PERMITTING AND WELLS UNIT
MAIL TO: P.O. BOX 36020, PHOENIX, ARIZONA 85067-6020
1110 W. Washington St. Suite 310, Phoenix, Arizona 85007-2952
Phone (602) 771-8527 Fax (602) 771-8590**

RECEIVED**AUG 21 2017**

**NOTICE OF INTENTION TO DRILL A NON-EXEMPT WELL PURSUANT TO A GROUNDWATER
WITHDRAWAL PERMIT (OTHER THAN A GENERAL INDUSTRIAL USE PERMIT)
IN AN ACTIVE MANAGEMENT AREA**

PLEASE READ GENERAL INSTRUCTIONS AND CONDITIONS ON REVERSE SIDE OF THIS FORM BEFORE COMPLETING.

Section § 45-598, Arizona Revised Statutes provides: In an Active Management Area, prior to drilling a well, a person entitled to withdraw groundwater shall file a Notice of Intention to Drill with the Department. Pursuant to A.R.S. § 45-596 and A.A.C. R12-15-104, the filing fee for this application is \$150.00.

1. WELL/LAND LOCATION:

4S	N/S	9E	E/W	28	
Township	Range	Section			
SE	1/4	NW	1/4	SW	1/4
10 Acre	40 Acre	160 Acre			

2. POSITION LOCATION OF THE WELL:

Latitude 33 ° 3' 0.7" N

Longitude 111 ° 26' 6.36" W

3. COUNTY Pinal

4. APPLICANT

Florence Copper, Inc.

Name 1575 W Hunt Hwy

Mailing Address Florence AZ 85132

City State Zip

Telephone No. 520-374-3984

5. OWNER OF THE LAND OF WELLSITE:

AZ State Land (Mineral Lease #11-026500)

Name 1616 W Adams Street

Mailing Address Phoenix AZ 85007

City State Zip

Telephone No. 602-542-4631

6. THIS NOTICE IS FILED BY:

Check one: Owner Lessee

Ian Ream

Name 1575 W Hunt Hwy

Mailing Address Florence AZ 85132

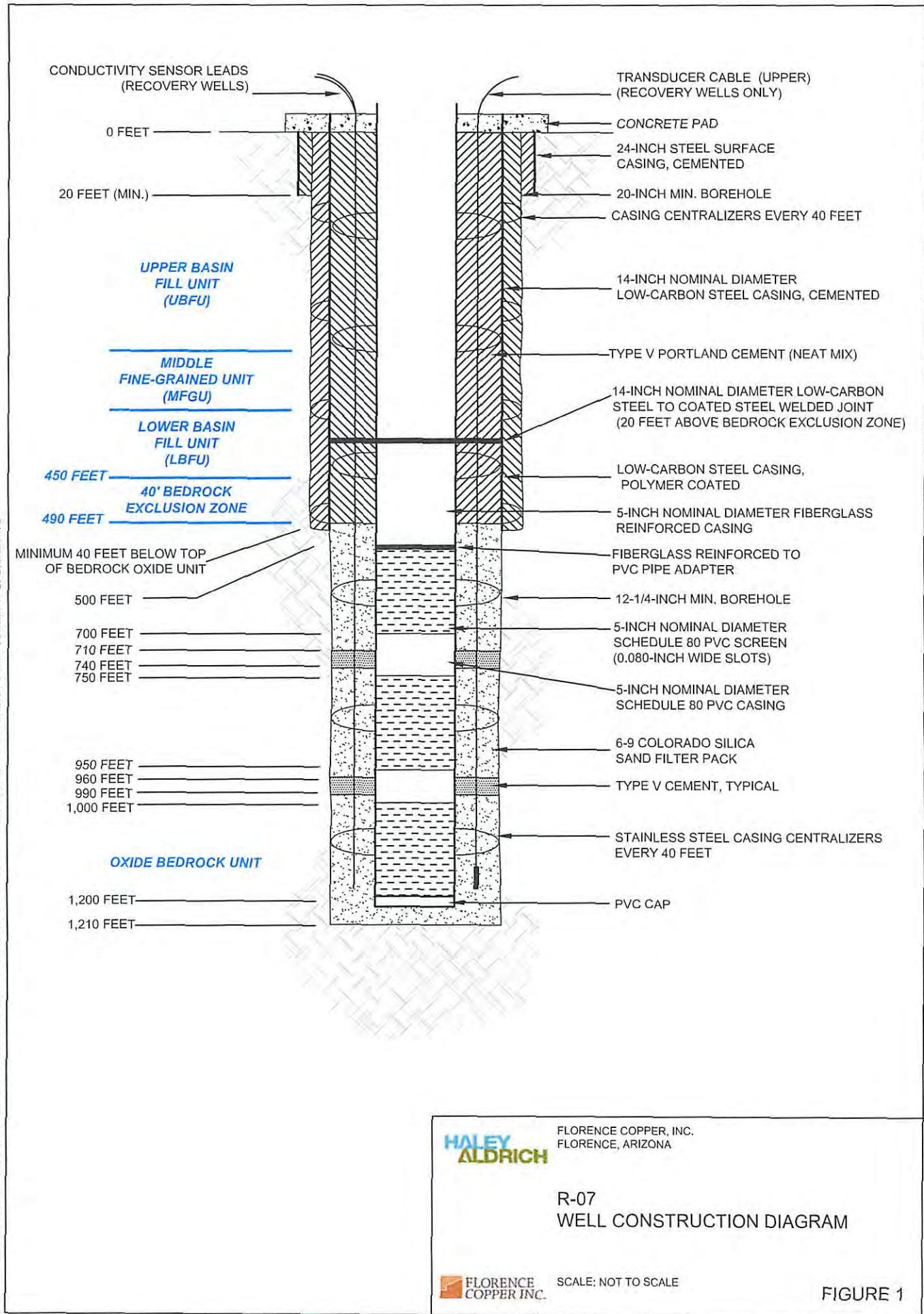
City State Zip

- 15. Attach a detailed construction diagram of the proposed well design. The diagram should provide verification of consistency with minimum construction requirements. Specifically, the diagram should include an indication of the perforated interval location(s) in relationship to the expected water level; the depth and thickness of the surface seal, and grouting material used; whether the surface or conductor casing will extend above grade; and vault details, if specified.**

I state that this Notice is filed in compliance with Rules A.A.C. R12-15-809 and R12-15-816(F), and is complete and correct to the best of my knowledge and belief, and that I understand the conditions set forth on the reverse side of this form.

Ian Ream PR
Type or Print Name and Signature

Land Owner Lessee of well site Title Date



ARIZONA DEPARTMENT OF WATER RESOURCES

GROUNDWATER PERMITTING AND WELLS UNIT

1110 W. Washington St. Suite 310, Phoenix, Arizona 85007-2952

Phone (602) 771-8585 Fax (602) 771-8688

WELL CONSTRUCTION SUPPLEMENT (form DWR 55-90)

Well Registration Number 55-227706

1. Well Location:

SE $\frac{1}{4}$ of the NW $\frac{1}{4}$ of the SW $\frac{1}{4}$, Sec. 28, Township 4S Range 9E.
10AC 40AC 160AC

2. Position Location of the Well:

Latitude 33°3'0.7" Longitude 111°26'6.36"

Datum: NAD 83 NAD 27 Other: _____

3. County: PINAL

4. Date construction to start: SEPTEMBER 2017

5. Time period well will remain in use: 5 YEARS

6. Is pump equipment to be installed? YES If so, design pump capacity: 30 GPM.

7. Well construction plan:

a. Drilling method (mud rotary, hollow-stem auger, etc.) MUD ROTARY

b. Borehole diameters 30 inches from 0 feet to 20 feet.
20 20 490
12.25 490 1210 feet.

c. Casing materials STEEL/FIBERGLASS REINFORCED PLASTIC/PVC

d. Method of well development (bail, air lift, surge, etc.) AIRLIFT, SURGE

e. Will surface or conductor casing extend above grade? NO

8. Include a detailed construction diagram of the proposed well design. The diagram should verify consistency with minimum construction requirements specified in the Department's well construction rules found in Arizona Administrative Code (A.A.C.) R12-15-801 et seq. Specifically, the diagram should include borehole diameters; casing materials and diameters; perforation intervals; the expected water level; depth and thickness of the surface seal; proposed grouting materials; and the length that the surface or conductor casing will extend above grade, or vault details, if specified.

Pursuant to Arizona Revised Statutes (A.R.S.) § 45-594.B, all well construction, replacement, deepening and abandonment operations shall comply with the rules adopted pursuant to this section. Therefore, any existing well that is deepened or modified must be brought into compliance with minimum well construction standards specified above, if not already in compliance.

9. Proposed materials and method of abandonment if well is to be abandoned after project is completed (Minimum requirements per A.A.C. R12-15-816):

10. Is the proposed wellsite within 100 feet of a septic tank system, sewage disposal area, landfill, hazardous waste facility, storage area of hazardous material, or petroleum storage area or tank? Yes No

11. Is this well to monitor existing contamination? Yes No

Potential contamination? Yes No If yes, please provide explanation: _____

12. Name of Consulting firm, if any: HALEY & ALDRICH, INC.

400 E VAN BUREN STREET SUITE 545 Address	PHOENIX City	AZ State	85004 Zip
---	-----------------	-------------	--------------

Contact Person: LAUREN CANDREVA Telephone Number: 602-760-2429

13. Drilling firm HYDRORESOURCES

DWR License Number: 816 ROC License Category: A-4

14. Special construction standards, if any, required pursuant to A.A.C. R12-15-821: _____

I (we), Ian Ream hereby affirm that all information provided in this
(print name) application is true and correct to the best of my/our
knowledge and belief.

Signature of Applicant IR

Date 3-17-2017



Memorandum

To: Stella Murillo, Groundwater Permitting and Wells
From: Phil Whitmore, Groundwater Permitting and Wells *JW*
CC: Jeff Tannler, Statewide AMA Director
Date: 8/29/2017
Subject: Review of Application for a Permit to Drill or Operate Nine Non-exempt Wells
within an Active Management Area
59-562120 55-227700-08 D(4-9)CAC & CBD
Florence Copper, Inc.

ADWR has reviewed the above-referenced applications for nine (9) permits to drill and operate a non-exempt well in the Pinal AMA. This hydrologist review is limited to conformance with well construction standards only.

The applicant proposes to withdraw 48.5 acre-feet per year from 8 of the new wells and 97 acre-feet per year from one well pursuant to the applicant's Mineral Extraction Withdrawal permit (59-562120.0005).

Well Construction

The applicant proposes that all nine (9) wells will be drilled and constructed in the same manner and drill depths. Each well will be 1210 feet deep with three (3) 200-foot screen intervals all open in the bedrock aquifer only. Eight of wells will have 5-inch and one will have 8-inch diameter inner casing constructed with PVC and include elements to reduce chemical corrosion.

The applications each included proposed well construction diagrams indicating that the outer annulus of the wells will be sealed from the surface to 20 feet below land surface and an inner annulus will be sealed to 490 below land surface. The estimated contact of the lower basin fill unit and the crystalline bedrock is approximately 490 feet deep.

The well diagrams did not indicate the height of well stick up and the applicant did not include a request for variance. However, if stick up is to be less than 1 foot above land surface a request for variance should be submitted to comply with Arizona Administrative Code R12-15-820.

Conclusion

We recommend issuing a permit to drill and operate all nine (9) non-exempt wells in the proposed location, at the volume and well construction specifications stated in the application.

Arizona Department of Water Resources

1110 West Washington Street, Suite 310
Phoenix AZ 85007

Customer:

LINDA DOMBROWSKI
70 BLANCHARD ROAD
BURLINGTON, MA 01803

Receipt #: 18-53414
Office: MAIN OFFICE
Receipt Date: 08/21/2017
Sale Type: IN_PERSON
Cashier: WRSAM

Item No.	Function Code	AOBJ	Description	Ref ID	Qty	Unit Price	Ext Price
67491	122221	4439-TT	Permit to drill non-exempt well in an active management area	227706	1	150.00	150.00
RECEIPT TOTAL:							150.00

Payment type: CREDIT CARD

Amount Paid: \$150.00

Authorization 189991565

Payment Received Date: 08/21/2017

Notes: FROM TTA.

APPENDIX B
Lithologic Log

LITHOLOGIC LOG							R-07
Project Production Test Facility, Florence, Arizona Client Florence Copper, Inc. Contractor Cascade Drilling LLC							File No. 129687 Sheet No. 1 of 15 Cadastral Location D (4-9) 28 CBD
Drilling Method		Reverse Rotary		Land Surface Elevation	1477.48	feet, amsl	Start 27 December 2017
Borehole Diameter(s)		30/20/12.25 in.		Datum	State Plane NAD 83		Finish 9 January 2018
Rig Make & Model		Challenger 280		Location	N 746,132	E 847,553	H&A Rep. C. Giusti
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION			COMMENTS
0		SM		SILTY SAND (0-24 feet) Primarily fine to coarse sand with ~25% fines and ~10% gravel up to 145mm. Sand is subangular to subrounded and gravel is subangular to rounded. Fines have low plasticity, low toughness, medium dry strength, and are reddish brown (7.5YR 4/3). UBFU			Well Registry ID: 55-227706 Surface Completion: Bolted Sealed Well Flange Well casing stickup: 1.2 feet als COLOR IDENTIFICATION MADE WITH WET SAMPLES USING MUNSELL CHART
-1475							
5							
-1470							
10							
-1465							
15							
-1460							
20							
-1455							
24		SW-SM		WELL GRADED SAND with SILT and GRAVEL (24-36 feet) Primarily fine to coarse sand with ~10% fines and ~25% gravel up to 185mm. Sand is subangular to subrounded and gravel is subangular to rounded. Fines have low plasticity, low toughness, low dry strength, and are reddish brown (7.5YR 4/3). UBFU			
-25							
-1450							
30							
-1445							
35							
-1440		SP		CLAYEY SAND (36-65 feet) Primarily medium sand with ~15% fines and ~5% gravel up to 100mm. Sand is subrounded to angular and gravel is subangular. Fines are nonplastic, have no toughness, no dry strength, are dark brown (7.5YR 5/3), and no reaction to HCL. UBFU			
40							
-1435							
45							
-1430							
50							
-1425							
55							
-1420							
60							
-1415							
65		SC		CLAYEY SAND (65-80 feet) Primarily fine to coarse sand with ~40% fines and ~10% gravel up to 12mm. Sand is subrounded to angular and gravel is subangular and subrounded. Fines have medium plasticity, medium toughness, high dry strength, are reddish brown (7.5YR 5/4), and moderate reaction to HCL. UBFU			
-1410							
70							
-1405							
75							
NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).							R-07

LITHOLOGIC LOG							R-07
							File No. 129687 Sheet No. 2 of 15
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION			
-75							
-1400							
80							
-1395	SW-SM		80	WELL GRADED SAND with SILT (80-100 feet) Primarily coarse to fine sand with ~ 10% fines and ~ 10% gravel up to 18mm. Sand is subrounded to angular and gravel is subrounded to subangular. Fines have low plasticity, low toughness, low dry strength, are light brown (7.5YR 5/3), and weak reaction to HCL. UBFU			
85							
-1390							
90							
-1385							
95							
-1380							
100	SC		100	CLAYEY SAND (100-110 feet) Primarily fine to medium sand with ~ 25% fines and ~ 5% gravel up to 12mm. Sand is subrounded to angular and gravel is subrounded to subangular. Fines have medium plasticity, medium toughness, high dry strength, are reddish brown (7.5YR 5/4), and weak reaction to HCL. UBFU			
-1375							
105							
-1370							
110	SW-SM		110	WELL GRADED SAND (110-115 feet) Primarily fine to coarse sand with ~ 5% fines and ~ 10% gravel up to 10mm. Sand is subrounded to angular and gravel is subrounded to subangular. Fines are nonplastic, no toughness, low dry strength, are brown (7.5YR 5/2), and no reaction to HCL. UBFU			
-1365							
115	CH		115	FAT CLAY WITH SAND (115-150 feet) Primarily fines with ~ 25% sands and trace gravel up to 7mm. Sand is subangular to angular and gravel is subrounded. Fines have high plasticity, medium toughness, high dry strength, are reddish brown (7.5YR 5/4), and strong reaction to HCL. UBFU			
-1360							
120							
-1355							
125							
-1350							
130							
-1345							
135							
-1340							
140							
-1335							
145							
-1330							
150	SW-SM		150	WELL GRADED SAND with SILT and GRAVEL (150-155 feet) Primarily fine to coarse sand with ~ 10% fines and 20% gravel up to 14mm. Sand is subangular to angular and gravel is subrounded to subangular. Fines have low plasticity, low toughness, low dry strength, are brown (7.5YR 5/2), and no reaction to HCL. UBFU			
-1325							
155	CH		155	FAT CLAY with SAND (155-175 feet) Primarily fines with ~ 15% sands and ~ 5% gravel up to 9mm. Sand is subrounded to angular and gravel is subangular to subrounded. Fines have high plasticity, medium toughness, high dry strength, are reddish brown (7.5YR 5/4), and strong reaction to HCL. UBFU			
-1320							
160							
NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).							R-07

LITHOLOGIC LOG					R-07 File No. 129687 Sheet No. 3 of 15
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION	
-1315					
-165					
-1310					
-170					
-1305					
-175					
-1300	SW-SC		175	WELL GRADED SAND with CLAY (175-205 feet) Primarily medium sand with ~10% fines and ~10% gravel up to 11mm. Sand is subangular to subrounded and gravel is subangular to rounded. Fines have low plasticity, low toughness, medium dry strength, are light brown (7.5YR 6/3), and weak reaction to HCL. UBFU	
-180					
-1295					
-185					
-1290					
-190					
-1285					
-195					
-1280					
-200					
-1275					
-205	SC		205	CLAYEY SAND (205-220 feet) Primarily fine to coarse sand with ~30% fines and ~5% gravel up to 9mm. Sand and gravel is subangular to rounded. Fines have medium plasticity, medium toughness, high dry strength, are reddish brown (5YR 5/4), and strong reaction to HCL. UBFU	
-1270					
-210					
-1265					
-215					
-1260					
-220	SW-SC		220	WELL GRADED SAND WITH CLAY (220-235 feet) Primarily fine to coarse sand with ~10% fines and ~10% gravel up to 25mm. Sand is subangular to subrounded and gravel is subangular to rounded. Fines have low plasticity, low toughness, medium dry strength, are light brown (7.5YR 6/3), and weak reaction to HCL. UBFU	
-1255					
-225					
-1250					
-230					
-1245					
-235	SC		235	CLAYEY SAND (235-250 feet) Primarily coarse to fine sand with ~25% fines and ~5% gravel up to 6mm. Sand is subangular to subrounded and gravel is subangular to rounded. Fines have medium plasticity, medium toughness, high dry strength, are reddish brown (5YR 5/4), and strong reaction to HCL. UBFU	
-1240					
-240					
-1235					
-245					
-1230					

LITHOLOGIC LOG						R-07 File No. 129687 Sheet No. 4 of 15
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION		
-250			250			
-1225		SW-SC		WELL GRADED SAND with CLAY and GRAVEL (250-281 feet) Primarily coarse to fine sand with ~10% fines and 15% gravel up to 22mm. Sand is subangular to subrounded and gravel is subangular to rounded. Fines have low plasticity, low toughness, low dry strength, are brown (7.5YR 4/4), and weak reaction to HCL. UBFU		
-255						
-220						
-260						
-215						
-265						
-210						
-270						
-205						
-275						
-200						
-280						
-1195		CH	281	FAT CLAY (281-301 feet) Primarily fines with ~10% sands and no gravel. Sand is angular to subrounded. Fines have high plasticity, high toughness, high dry strength, are reddish yellow (5YR 6/6), and strong reaction to HCL. UBFU		
-285						
-1190						
-290						
-1185						
-295						
-1180						
-300						
-1175		SC	301	CLAYEY SAND (301-310 feet) Primarily fine to coarse sand with ~20% fines and ~5% gravel up to 15mm. Sand is subangular to subrounded and gravel is subangular to rounded. Fines have medium plasticity, low toughness, medium dry strength, are light reddish brown (5YR 6/4), and strong reaction to HCL. MGFU		
-305						
-1170						
-310						
-1165		SW-SC	310	WELL GRADED SAND with CLAY (310-370 feet) Primarily fine to coarse sand with ~10% fines and ~5% gravel up to 25mm. Sand is subangular to rounded and gravel is subangular to subrounded. Fines have low plasticity, low toughness, medium dry strength, are light brown (7.5YR 6/3), and strong reaction to HCL. LBFU		
-315						
-1160						
-320						
-1155						
-325						
-1150						
-330						
-1145						
-335			335			

LITHOLOGIC LOG						R-07
						File No. 129687 Sheet No. 5 of 15
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION		
-1140	SW-SC			WELL GRADED SAND with CLAY (310-370 feet) Continued.		
-340						
-1135						
-345						
-1130						
-350						
-1125						
-355						
-1120						
-360						
-1115						
-365						
-1110						
-370	370			QUARTZ MONZONITE (370-670 feet) Consists of quartz at approximately 35%, potassium feldspars at approximately 35%, plagioclase at approximately 25%, and biotite at approximately 5%. Abundant Cu minerals at 485', 540', and 600'		
-1105						
-375						
-1100						
-380						
-1095						
-385						
-1090						
-390						
-1085						
-395						
-1080						
-400						
-1075						
-405						
-1070						
-410						
-1065						
-415						
-1060						
-420	422					

NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).

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HALEY ALDRICH LITHOLOGIC LOG					R-07 File No. 129687 Sheet No. 6 of 15
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)		
VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION					
-1055			<u>QUARTZ MONZONITE</u> (370-670 feet) Continued		
-425					
-1050					
-430					
-1045					
-435					
-1040					
-440					
-1035					
-445					
-1030					
-450					
-1025					
-455					
-1020					
-460					
-1015					
-465					
-1010					
-470					
-1005					
-475					
-1000					
-480					
-995					
-485					
-990					
-490					
-985					
-495					
-980					
-500					
-975					
-505					
-970					

HALEY ALDRICH					LITHOLOGIC LOG	R-07 File No. 129687 Sheet No. 7 of 15
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION		
-510						509 QUARTZ MONZONITE (370-670 feet) Continued
-965						
-515						
-960						
-520						
-955						
-525						
-950						
-530						
-945						
-535						
-940						
-540						
-935						
-545						
-930						
-550						
-925						
-555						
-920						
-560						
-915						
-565						
-910						
-570						
-905						
-575						
-900						
-580						
-895						
-585						
-890						
-590						
-885						
-595						
NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).						R-07

HALEY ALDRICH					LITHOLOGIC LOG	R-07 File No. 129687 Sheet No. 8 of 15
VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION						
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)			
QUARTZ MONZONITE (370-670 feet) Continued						
-880						
-600						
-875						
-605						
-870						
-610						
-865						
-615						
-860						
-620						
-855						
-625						
-850						
-630						
-845						
-635						
-840						
-640						
-835						
-645						
-830						
-650						
-825						
-665						
-820						
-660						
-815						
-670						
<u>DIABASE (670-695 feet)</u> Dark gray to black igneous rock.						
-805						
-675						
-800						
-680						
-795						
682						

LITHOLOGIC LOG					R-07 File No. 129687 Sheet No. 9 of 15
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION	
685				<u>DIABASE</u> (670-695 feet) Continued	
790					
690					
785					
695	695			QUARTZ MONZONITE (695-1020 feet) Consists of quartz at approximately 35%, potassium feldspars at approximately 35%, plagioclase at approximately 25%, and biotite at approximately 5%. Significant amount of clay at 945-950.	
780					
700					
775					
705					
770					
710					
765					
715					
760					
720					
755					
725					
750					
730					
745					
735					
740					
730					
750					
725					
755					
720					
760					
715					
765					
710					
710	769				

HALEY ALDRICH				LITHOLOGIC LOG	R-07 File No. 129687 Sheet No. 10 of 15
VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION					
				QUARTZ MONZONITE (695-1020 feet) Continued	
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)		
-770					
-705					
-775					
-700					
-780					
-695					
-785					
-690					
-790					
-685					
-795					
-680					
-800					
-675					
-805					
-670					
-810					
-665					
-815					
-660					
-820					
-655					
-825					
-650					
-830					
-645					
-835					
-640					
-840					
-635					
-845					
-630					
-850					
-625					
-855					
			856		

**HALEY
ALDRICH**

LITHOLOGIC LOG

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File No. 129687
Sheet No. 11 of 15

Sheet No. 11 of 15

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
-620				QUARTZ MONZONITE (695-1020 feet) Continued
-860				
-615				
-865				
-610				
-870				
-605				
-875				
-600				
-880				
-595				
-885				
-590				
-890				
-585				
-895				
-580				
-900				
-575				
-905				
-570				
-910				
-565				
-915				
-560				
-920				
-555				
-925				
-550				
-930				
-545				
-935				
-540				
-940				
-535				

NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).

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HALEY ALDRICH					LITHOLOGIC LOG	R-07 File No. 129687 Sheet No. 12 of 15
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION		
-945				QUARTZ MONZONITE (695-1020 feet) Continued		
-530						
-950						
-525						
-955						
-520						
-960						
-515						
-965						
-510						
-970						
-505						
-975						
-500						
-980						
-495						
-985						
-490						
-990						
-485						
-995						
-480						
-1000						
-475						
-1005						
-470						
-1010						
-465						
-1015						
-460						
-1020	1020					
-455				DIABASE (1020-1045 feet) Dark gray to black igneous rock. Strong mineralization at 1020-1025. Higher clay content at 1030-1040.		
-1025						
-450						

LITHOLOGIC LOG					R-07 File No. 129687 Sheet No. 13 of 15
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION	
1030	1030			<u>DIABASE</u> (1020-1045 feet) Continued	
445					
1035					
440					
1040					
435					
1045	1045			<u>QUARTZ MONZONITE</u> (1045-1244 feet) Consists of quartz at approximately 35%, potassium feldspars at approximately 35%, plagioclase at approximately 25%, and biotite at approximately 5%.	
430					
1050					
425					
1055					
420					
1060					
415					
1065					
410					
1070					
405					
1075					
400					
1080					
395					
1085					
390					
1090					
385					
1095					
380					
1100					
375					
1105					
370					
1110					
365					
1115					

HALEY ALDRICH					LITHOLOGIC LOG	R-07 File No. 129687 Sheet No. 14 of 15
VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION						
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)			
-360	1117	QUARTZ MONZONITE (1045-1244 feet) Continued				
-355						
-350						
-345						
-340						
-335						
-330						
-325						
-320						
-315						
-310						
-305						
-300						
-295						
-290						
-285						
-280						
-275						
NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).						R-07

**HALEY
ALDRICH**

LITHOLOGIC LOG

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File No. 129687
Sheet No. 15 of 15

Sheet No. 15 of 15

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
1205			1204	<u>QUARTZ MONZONITE (1045-1244 feet) Continued</u>
270				
1210				
265				
1215				
260				
1220				
255				
1225				
250				
1230				
245				
1235				
240				
1240				
235			1244	

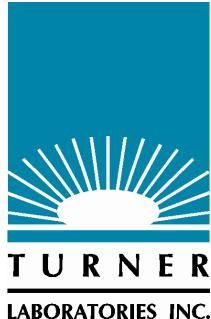
Total Borehole Depth: Driller = 1244 feet; Geophysical Logging = 1220 feet

NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).

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APPENDIX C

Chemical Characteristics of Formation Water



May 23, 2018

Barbara Sylvester
Brown & Caldwell
201 E. Washington Suite 500
Phoenix, AZ 85004

TEL (602) 567-3894
FAX -

RE: PTF

Work Order No.: 18D0619
Order Name: Florence Copper

Dear Barbara Sylvester,

Turner Laboratories, Inc. received 2 sample(s) on 04/25/2018 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.
ADHS License AZ0066

A handwritten signature in black ink that reads "Kevin Brim".

Kevin Brim
Project Manager

Client: Brown & Caldwell
Project: PTF
Work Order: 18D0619
Date Received: 04/25/2018

Order: Florence Copper

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date/Time
18D0619-01	R-09	Ground Water	04/23/2018 1555
18D0619-02	TB	Ground Water	04/25/2018 0000

Client: Brown & Caldwell
Project: PTF
Work Order: 18D0619
Date Received: 04/25/2018

Case Narrative

The 8015D analysis was performed by TestAmerica Laboratories, Inc. in Phoenix, AZ.

The radiochemistry analysis was performed by Radiation Safety Engineering, Inc. in Chandler, AZ.

D5 Minimum Reporting Limit (MRL) is adjusted due to sample dilution; analyte was non-detect in the sample.

H5 This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.

M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated LCS/LCSD recovery was acceptable.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND Not Detected at or above the PQL

PQL Practical Quantitation Limit

DF Dilution Factor

PRL Project Reporting Limit

Turner Laboratories, Inc.**Date: 05/23/2018**

Client: Brown & Caldwell
Project: PTF
Work Order: 18D0619
Lab Sample ID: 18D0619-01

Client Sample ID: R-09
Collection Date/Time: 04/23/2018 1555
Matrix: Ground Water
Order Name: Florence Copper

Analyses	Result	PRL	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
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ICP Dissolved Metals-E 200.7 (4.4)

Calcium	140	4.0	M3	mg/L	1	04/27/2018	1440	05/04/2018	1150	MH
Iron	ND	0.30		mg/L	1	04/27/2018	1440	05/04/2018	1150	MH
Magnesium	27	3.0		mg/L	1	04/27/2018	1440	05/04/2018	1150	MH
Potassium	6.8	5.0		mg/L	1	04/27/2018	1440	05/04/2018	1150	MH
Sodium	170	5.0	M3	mg/L	1	04/27/2018	1440	05/04/2018	1150	MH

ICP/MS Dissolved Metals-E 200.8 (5.4)

Aluminum	ND	0.0800	D5	mg/L	2	04/27/2018	1440	05/07/2018	1139	MH
Antimony	ND	0.00050		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Arsenic	0.0016	0.00050		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Barium	0.071	0.00050		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Beryllium	ND	0.00050	D5	mg/L	2	04/27/2018	1440	05/07/2018	1139	MH
Cadmium	ND	0.00025		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Chromium	0.0051	0.00050		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Cobalt	ND	0.00025		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Copper	0.011	0.00050		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Lead	ND	0.00050		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Manganese	0.0020	0.00025		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Nickel	0.0033	0.00050		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Selenium	ND	0.0025		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Thallium	ND	0.00050		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Zinc	ND	0.040		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH

CVAA Dissolved Mercury-E 245.1

Mercury	ND	0.0010		mg/L	1	04/26/2018	0955	04/26/2018	1639	MH
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pH-E150.1

pH (pH Units)	7.8	H5	-	1	04/26/2018	1615	04/26/2018	1616	AP
Temperature (°C)	22	H5	-	1	04/26/2018	1615	04/26/2018	1616	AP

ICP/MS Total Metals-E200.8 (5.4)

Uranium	0.016	0.00050		mg/L	1	04/27/2018	1230	04/30/2018	1348	MH
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Client: Brown & Caldwell
Project: PTF
Work Order: 18D0619
Lab Sample ID: 18D0619-01

Client Sample ID: R-09
Collection Date/Time: 04/23/2018 1555
Matrix: Ground Water
Order Name: Florence Copper

Analyses	Result	PRL	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Anions by Ion Chromatography-E300.0 (2.1)									
Chloride	310		25		mg/L	25	04/26/2018 1225	04/26/2018 1415	AP
Fluoride	ND		0.50		mg/L	1	04/25/2018 1208	04/25/2018 1544	AP
Nitrogen, Nitrate (As N)	8.8		0.50		mg/L	1	04/25/2018 1208	04/25/2018 1544	AP
Nitrogen, Nitrite (As N)	ND		0.10		mg/L	1	04/25/2018 1208	04/25/2018 1544	AP
Sulfate	190		130		mg/L	25	04/26/2018 1225	04/26/2018 1415	AP
Cyanide-E335.4									
Cyanide	ND		0.10		mg/L	1	04/26/2018 0845	04/30/2018 1545	AP
Alkalinity-SM2320B									
Alkalinity, Bicarbonate (As CaCO3)	150		2.0		mg/L	1	05/03/2018 1030	05/03/2018 1210	EJ
Alkalinity, Carbonate (As CaCO3)	ND		2.0		mg/L	1	05/03/2018 1030	05/03/2018 1210	EJ
Alkalinity, Hydroxide (As CaCO3)	ND		2.0		mg/L	1	05/03/2018 1030	05/03/2018 1210	EJ
Alkalinity, Phenolphthalein (As CaCO3)	ND		2.0		mg/L	1	05/03/2018 1030	05/03/2018 1210	EJ
Alkalinity, Total (As CaCO3)	150		2.0		mg/L	1	05/03/2018 1030	05/03/2018 1210	EJ
Specific Conductance-SM2510 B									
Conductivity	1700		0.20		μmhos/cm	2	05/09/2018 1315	05/09/2018 1330	AP
Total Dissolved Solids (Residue, Filterable)-SM2540 C									
Total Dissolved Solids (Residue, Filterable)	1000		20		mg/L	1	04/26/2018 0826	05/01/2018 1600	EJ
Volatile Organic Compounds by GC/MS-SW8260B									
Benzene	ND		0.50		ug/L	1	05/07/2018 1824	05/07/2018 1943	KP
Carbon disulfide	ND		2.0		ug/L	1	05/07/2018 1824	05/07/2018 1943	KP
Ethylbenzene	ND		0.50		ug/L	1	05/07/2018 1824	05/07/2018 1943	KP
Toluene	ND		0.50		ug/L	1	05/07/2018 1824	05/07/2018 1943	KP
Xylenes, Total	ND		1.5		ug/L	1	05/07/2018 1824	05/07/2018 1943	KP
<i>Surr: 4-Bromofluorobenzene</i>	95	70-130		%REC	1	05/07/2018 1824	05/07/2018 1943	KP	
<i>Surr: Dibromofluoromethane</i>	101	70-130		%REC	1	05/07/2018 1824	05/07/2018 1943	KP	
<i>Surr: Toluene-d8</i>	77	70-130		%REC	1	05/07/2018 1824	05/07/2018 1943	KP	

Turner Laboratories, Inc.**Date: 05/23/2018**

Client: Brown & Caldwell
Project: PTF
Work Order: 18D0619
Lab Sample ID: 18D0619-02

Client Sample ID: TB
Collection Date/Time: 04/25/2018 0000
Matrix: Ground Water
Order Name: Florence Copper

Analyses	Result	PRL	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
Volatile Organic Compounds by GC/MS-SW8260B									
Benzene	ND		0.50		ug/L	1	05/07/2018 1824	05/07/2018 2344	KP
Carbon disulfide	ND		2.0		ug/L	1	05/07/2018 1824	05/07/2018 2344	KP
Ethylbenzene	ND		0.50		ug/L	1	05/07/2018 1824	05/07/2018 2344	KP
Toluene	ND		0.50		ug/L	1	05/07/2018 1824	05/07/2018 2344	KP
Xylenes, Total	ND		1.5		ug/L	1	05/07/2018 1824	05/07/2018 2344	KP
<i>Surr: 4-Bromofluorobenzene</i>	101	70-130		%REC	1	05/07/2018 1824	05/07/2018 2344	KP	
<i>Surr: Dibromofluoromethane</i>	110	70-130		%REC	1	05/07/2018 1824	05/07/2018 2344	KP	
<i>Surr: Toluene-d8</i>	103	70-130		%REC	1	05/07/2018 1824	05/07/2018 2344	KP	

Client: Brown & Caldwell
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QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD RPD	RPD Limit Qual	
Batch 1804269 - E 245.1									
Blank (1804269-BLK1) Prepared & Analyzed: 04/26/2018									
Mercury	ND	0.0010	mg/L						
LCS (1804269-BS1) Prepared & Analyzed: 04/26/2018									
Mercury	0.0049	0.0010	mg/L	0.005000	98	85-115			
LCS Dup (1804269-BSD1) Prepared & Analyzed: 04/26/2018									
Mercury	0.0048	0.0010	mg/L	0.005000	95	85-115	2	20	
Matrix Spike (1804269-MS1) Source: 18D0394-01 Prepared & Analyzed: 04/26/2018									
Mercury	0.0050	0.0010	mg/L	0.005000	0.00020	97	85-115		
Matrix Spike Dup (1804269-MSD1) Source: 18D0394-01 Prepared & Analyzed: 04/26/2018									
Mercury	0.0050	0.0010	mg/L	0.005000	0.00020	96	85-115	1	20
Batch 1804292 - E200.8 (5.4)									
Blank (1804292-BLK1) Prepared & Analyzed: 04/30/2018									
Uranium	ND	0.00050	mg/L						
LCS (1804292-BS1) Prepared & Analyzed: 04/30/2018									
Uranium	0.046	0.00050	mg/L	0.05000	92	85-115			
LCS Dup (1804292-BSD1) Prepared & Analyzed: 04/30/2018									
Uranium	0.046	0.00050	mg/L	0.05000	92	85-115	0.2	20	
Matrix Spike (1804292-MS1) Source: 18D0614-01 Prepared & Analyzed: 04/30/2018									
Uranium	0.051	0.00050	mg/L	0.05000	0.0015	99	70-130		
Batch 1805051 - E 200.7 (4.4)									
Blank (1805051-BLK1) Prepared & Analyzed: 05/04/2018									
Calcium	ND	4.0	mg/L						
Iron	ND	0.30	mg/L						
Magnesium	ND	3.0	mg/L						
Potassium	ND	5.0	mg/L						
Sodium	ND	5.0	mg/L						
LCS (1805051-BS1) Prepared & Analyzed: 05/04/2018									
Calcium	11	4.0	mg/L	10.00	109	85-115			
Iron	1.0	0.30	mg/L	1.000	104	85-115			
Magnesium	10	3.0	mg/L	10.00	105	85-115			
Potassium	10	5.0	mg/L	10.00	105	85-115			
Sodium	10	5.0	mg/L	10.00	105	85-115			
LCS Dup (1805051-BSD1) Prepared & Analyzed: 05/04/2018									
Calcium	11	4.0	mg/L	10.00	110	85-115	1	20	
Iron	1.0	0.30	mg/L	1.000	105	85-115	0.5	20	
Magnesium	10	3.0	mg/L	10.00	105	85-115	0.06	20	
Potassium	10	5.0	mg/L	10.00	105	85-115	0.05	20	
Sodium	11	5.0	mg/L	10.00	109	85-115	4	20	

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QC Summary

Analyst	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD RPD	RPD Limit	RPD Qual
Batch 1805051 - E 200.7 (4.4)										
Matrix Spike (1805051-MS1)										
Source: 18D0619-01 Prepared & Analyzed: 05/04/2018										
Calcium	150	4.0	mg/L	10.00	140	59	70-130		M3	
Iron	1.1	0.30	mg/L	1.000	0.028	105	70-130			
Magnesium	38	3.0	mg/L	10.00	27	108	70-130			
Potassium	17	5.0	mg/L	10.00	6.8	105	70-130			
Sodium	170	5.0	mg/L	10.00	170	30	70-130		M3	
Matrix Spike (1805051-MS2)										
Source: 18E0021-01 Prepared & Analyzed: 05/04/2018										
Calcium	64	4.0	mg/L	10.00	54	103	70-130			
Iron	1.0	0.30	mg/L	1.000	0.0060	101	70-130			
Magnesium	21	3.0	mg/L	10.00	11	99	70-130			
Potassium	15	5.0	mg/L	10.00	4.7	104	70-130			
Sodium	99	5.0	mg/L	10.00	90	87	70-130			
Batch 1805069 - E 200.8 (5.4)										
Blank (1805069-BLK1)										
Prepared & Analyzed: 05/07/2018										
Aluminum	ND	0.0400	mg/L							
Antimony	ND	0.00050	mg/L							
Arsenic	ND	0.00050	mg/L							
Barium	ND	0.00050	mg/L							
Beryllium	ND	0.00025	mg/L							
Cadmium	ND	0.00025	mg/L							
Chromium	ND	0.00050	mg/L							
Cobalt	ND	0.00025	mg/L							
Copper	ND	0.00050	mg/L							
Lead	ND	0.00050	mg/L							
Manganese	ND	0.00025	mg/L							
Nickel	ND	0.00050	mg/L							
Selenium	ND	0.0025	mg/L							
Thallium	ND	0.00050	mg/L							
Zinc	ND	0.040	mg/L							
LCS (1805069-BS1)										
Prepared & Analyzed: 05/07/2018										
Aluminum	0.104	0.0400	mg/L	0.1000		104	85-115			
Antimony	0.048	0.00050	mg/L	0.05000		96	85-115			
Arsenic	0.050	0.00050	mg/L	0.05000		100	85-115			
Barium	0.050	0.00050	mg/L	0.05000		100	85-115			
Beryllium	0.049	0.00025	mg/L	0.05000		97	85-115			
Cadmium	0.050	0.00025	mg/L	0.05000		100	85-115			
Chromium	0.051	0.00050	mg/L	0.05000		102	85-115			
Cobalt	0.051	0.00025	mg/L	0.05000		101	85-115			
Copper	0.051	0.00050	mg/L	0.05000		103	85-115			
Lead	0.049	0.00050	mg/L	0.05000		98	85-115			
Manganese	0.050	0.00025	mg/L	0.05000		101	85-115			
Nickel	0.051	0.00050	mg/L	0.05000		102	85-115			
Selenium	0.051	0.0025	mg/L	0.05000		103	85-115			
Thallium	0.050	0.00050	mg/L	0.05000		101	85-115			
Zinc	0.10	0.040	mg/L	0.1000		101	85-115			

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QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD RPD	RPD Limit	RPD Qual
Batch 1805069 - E 200.8 (5.4)										
LCS Dup (1805069-BSD1)										
Prepared & Analyzed: 05/07/2018										
Aluminum	0.115	0.0400	mg/L	0.1000	115	85-115	10	20		
Antimony	0.048	0.00050	mg/L	0.05000	96	85-115	0.7	20		
Arsenic	0.050	0.00050	mg/L	0.05000	101	85-115	0.8	20		
Barium	0.051	0.00050	mg/L	0.05000	102	85-115	1	20		
Beryllium	0.049	0.00025	mg/L	0.05000	97	85-115	0.2	20		
Cadmium	0.050	0.00025	mg/L	0.05000	100	85-115	0.2	20		
Chromium	0.051	0.00050	mg/L	0.05000	102	85-115	0.4	20		
Cobalt	0.050	0.00025	mg/L	0.05000	101	85-115	0.5	20		
Copper	0.052	0.00050	mg/L	0.05000	105	85-115	2	20		
Lead	0.049	0.00050	mg/L	0.05000	98	85-115	0.1	20		
Manganese	0.050	0.00025	mg/L	0.05000	101	85-115	0.09	20		
Nickel	0.051	0.00050	mg/L	0.05000	103	85-115	0.8	20		
Selenium	0.052	0.0025	mg/L	0.05000	104	85-115	2	20		
Thallium	0.050	0.00050	mg/L	0.05000	101	85-115	0.06	20		
Zinc	0.10	0.040	mg/L	0.1000	104	85-115	3	20		
Matrix Spike (1805069-MS1)										
Source: 18D0693-01										
Prepared & Analyzed: 05/07/2018										
Aluminum	0.239	0.0400	mg/L	0.1000	0.166	74	70-130			
Antimony	0.045	0.00050	mg/L	0.05000	0.00024	90	70-130			
Arsenic	0.056	0.00050	mg/L	0.05000	0.0035	104	70-130			
Barium	0.16	0.00050	mg/L	0.05000	0.12	94	70-130			
Beryllium	0.045	0.00025	mg/L	0.05000	0.000029	90	70-130			
Cadmium	0.047	0.00025	mg/L	0.05000	ND	94	70-130			
Chromium	0.049	0.00050	mg/L	0.05000	0.00052	98	70-130			
Cobalt	0.048	0.00025	mg/L	0.05000	0.00097	95	70-130			
Copper	0.051	0.00050	mg/L	0.05000	0.0020	98	70-130			
Lead	0.047	0.00050	mg/L	0.05000	0.00016	94	70-130			
Manganese	0.054	0.00025	mg/L	0.05000	0.0075	94	70-130			
Nickel	0.049	0.00050	mg/L	0.05000	0.0018	94	70-130			
Selenium	0.057	0.0025	mg/L	0.05000	ND	114	70-130			
Thallium	0.048	0.00050	mg/L	0.05000	0.000038	96	70-130			
Zinc	0.11	0.040	mg/L	0.1000	ND	109	70-130			

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD RPD	RPD Limit	RPD Qual
Batch 1804261 - SM2540 C										
Duplicate (1804261-DUP1) Source: 18D0606-01 Prepared: 04/26/2018 Analyzed: 04/27/2018										
Total Dissolved Solids (Residue, Filterable)										
630 20 mg/L 630 0.3 5										
Duplicate (1804261-DUP2) Source: 18D0606-02 Prepared: 04/26/2018 Analyzed: 04/27/2018										
Total Dissolved Solids (Residue, Filterable)										
610 20 mg/L 620 0.8 5										
Batch 1804268 - E335.4										
Blank (1804268-BLK1) Prepared: 04/26/2018 Analyzed: 04/30/2018										
Cyanide										
ND 0.10 mg/L										
LCS (1804268-BS1) Prepared: 04/26/2018 Analyzed: 04/30/2018										
Cyanide										
2.0 0.10 mg/L 2.000 101 90-110										
LCS Dup (1804268-BSD1) Prepared: 04/26/2018 Analyzed: 04/30/2018										
Cyanide										
2.0 0.10 mg/L 2.000 101 90-110 0.1 20										
Matrix Spike (1804268-MS1) Source: 18D0602-03 Prepared: 04/26/2018 Analyzed: 04/30/2018										
Cyanide										
2.1 0.10 mg/L 2.000 ND 103 90-110										
Matrix Spike Dup (1804268-MSD1) Source: 18D0602-03 Prepared: 04/26/2018 Analyzed: 04/30/2018										
Cyanide										
2.0 0.10 mg/L 2.000 ND 98 90-110 5 20										
Batch 1804272 - E150.1										
Duplicate (1804272-DUP1) Source: 18D0662-02 Prepared & Analyzed: 04/26/2018										
pH (pH Units)										
7.8 - 7.8 0.1 200 H5										
Temperature (°C)										
21 - 21 2 200 H5										
Batch 1805027 - SM2320B										
LCS (1805027-BS1) Prepared & Analyzed: 05/03/2018										
Alkalinity, Total (As CaCO ₃)										
240 2.0 mg/L 250.0 96 90-110										
LCS Dup (1805027-BSD1) Prepared & Analyzed: 05/03/2018										
Alkalinity, Total (As CaCO ₃)										
240 2.0 mg/L 250.0 96 90-110 0 10										
Matrix Spike (1805027-MS1) Source: 18D0606-02 Prepared & Analyzed: 05/03/2018										
Alkalinity, Total (As CaCO ₃)										
370 2.0 mg/L 250.0 130 96 85-115										
Matrix Spike Dup (1805027-MSD1) Source: 18D0606-02 Prepared & Analyzed: 05/03/2018										
Alkalinity, Total (As CaCO ₃)										
370 2.0 mg/L 250.0 130 95 85-115 0.5 10										
Batch 1805103 - SM2510 B										
LCS (1805103-BS1) Prepared & Analyzed: 05/09/2018										
Conductivity										
140 0.10 μmhos/cm 141.2 101 0-200										
LCS Dup (1805103-BSD1) Prepared & Analyzed: 05/09/2018										
Conductivity										
140 0.10 μmhos/cm 141.2 101 0-200 0.7 200										
Duplicate (1805103-DUP1) Source: 18E0192-01 Prepared & Analyzed: 05/09/2018										
Conductivity										
4.0 0.10 μmhos/cm 4.0 0 10										

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QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD RPD	RPD Limit	RPD Qual
Batch 1805074 - SW8260B										
Blank (1805074-BLK1)										
Prepared & Analyzed: 05/07/2018										
Benzene	ND	0.50	ug/L							
Carbon disulfide	ND	2.0	ug/L							
Ethylbenzene	ND	0.50	ug/L							
Toluene	ND	0.50	ug/L							
Xylenes, Total	ND	1.5	ug/L							
<i>Surrogate: 4-Bromofluorobenzene</i>	25.0		ug/L	25.00		100	70-130			
<i>Surrogate: Dibromofluoromethane</i>	26.9		ug/L	25.00		107	70-130			
<i>Surrogate: Toluene-d8</i>	25.1		ug/L	25.00		100	70-130			
LCS (1805074-BS1)										
Prepared & Analyzed: 05/07/2018										
1,1-Dichloroethene	29		ug/L	25.00		114	70-130			
Benzene	27		ug/L	25.00		109	70-130			
Chlorobenzene	29		ug/L	25.00		115	70-130			
Toluene	25		ug/L	25.00		101	70-130			
Trichloroethene	26		ug/L	25.00		103	70-130			
<i>Surrogate: 4-Bromofluorobenzene</i>	24.6		ug/L	25.00		98	70-130			
<i>Surrogate: Dibromofluoromethane</i>	25.6		ug/L	25.00		102	70-130			
<i>Surrogate: Toluene-d8</i>	24.8		ug/L	25.00		99	70-130			
LCS Dup (1805074-BSD1)										
Prepared & Analyzed: 05/07/2018										
1,1-Dichloroethene	27		ug/L	25.00		110	70-130	4	30	
Benzene	26		ug/L	25.00		104	70-130	5	30	
Chlorobenzene	26		ug/L	25.00		105	70-130	9	30	
Toluene	24		ug/L	25.00		96	70-130	5	30	
Trichloroethene	25		ug/L	25.00		98	70-130	4	30	
<i>Surrogate: 4-Bromofluorobenzene</i>	24.4		ug/L	25.00		98	70-130			
<i>Surrogate: Dibromofluoromethane</i>	26.1		ug/L	25.00		104	70-130			
<i>Surrogate: Toluene-d8</i>	25.1		ug/L	25.00		100	70-130			
Matrix Spike (1805074-MS1)										
Source: 18D0582-02										
Prepared & Analyzed: 05/07/2018										
1,1-Dichloroethene	27		ug/L	25.00	0.070	109	70-130			
Benzene	26		ug/L	25.00	0.020	104	70-130			
Chlorobenzene	26		ug/L	25.00	0.0	105	70-130			
Toluene	27		ug/L	25.00	3.5	95	70-130			
Trichloroethene	24		ug/L	25.00	0.040	97	70-130			
<i>Surrogate: 4-Bromofluorobenzene</i>	24.4		ug/L	25.00		98	70-130			
<i>Surrogate: Dibromofluoromethane</i>	26.4		ug/L	25.00		106	70-130			
<i>Surrogate: Toluene-d8</i>	24.9		ug/L	25.00		100	70-130			
Matrix Spike Dup (1805074-MSD1)										
Source: 18D0582-02										
Prepared & Analyzed: 05/07/2018										
1,1-Dichloroethene	27		ug/L	25.00	0.070	108	70-130	0.8	30	
Benzene	25		ug/L	25.00	0.020	101	70-130	2	30	
Chlorobenzene	26		ug/L	25.00	0.0	105	70-130	0.3	30	
Toluene	27		ug/L	25.00	3.5	95	70-130	0.1	30	
Trichloroethene	24		ug/L	25.00	0.040	95	70-130	2	30	
<i>Surrogate: 4-Bromofluorobenzene</i>	24.7		ug/L	25.00		99	70-130			
<i>Surrogate: Dibromofluoromethane</i>	26.4		ug/L	25.00		106	70-130			
<i>Surrogate: Toluene-d8</i>	25.3		ug/L	25.00		101	70-130			

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QC Summary

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD RPD	RPD Limit Qual
Batch 1804245 - E300.0 (2.1)								
Blank (1804245-BLK1)								
Prepared & Analyzed: 04/25/2018								
Chloride	ND	1.0	mg/L					
Fluoride	ND	0.50	mg/L					
Nitrogen, Nitrate (As N)	ND	0.50	mg/L					
Nitrogen, Nitrite (As N)	ND	0.10	mg/L					
Sulfate	ND	5.0	mg/L					
LCS (1804245-BS1)								
Prepared & Analyzed: 04/25/2018								
Chloride	12	1.0	mg/L	12.50	92	90-110		
Fluoride	2.0	0.50	mg/L	2.000	101	90-110		
Nitrogen, Nitrate (As N)	4.7	0.50	mg/L	5.000	95	90-110		
Nitrogen, Nitrite (As N)	2.3	0.10	mg/L	2.500	92	90-110		
Sulfate	12	5.0	mg/L	12.50	96	90-110		
LCS Dup (1804245-BSD1)								
Prepared & Analyzed: 04/25/2018								
Chloride	12	1.0	mg/L	12.50	94	90-110	2	10
Fluoride	2.0	0.50	mg/L	2.000	101	90-110	0.4	10
Nitrogen, Nitrate (As N)	4.9	0.50	mg/L	5.000	98	90-110	3	10
Nitrogen, Nitrite (As N)	2.4	0.10	mg/L	2.500	95	90-110	3	10
Sulfate	12	5.0	mg/L	12.50	98	90-110	3	10
Matrix Spike (1804245-MS1)								
Source: 18D0613-08 Prepared & Analyzed: 04/25/2018								
Fluoride	3.7	0.50	mg/L	2.000	1.7	100	80-120	
Nitrogen, Nitrate (As N)	4.7	0.50	mg/L	5.000	0.22	89	80-120	
Matrix Spike (1804245-MS2)								
Source: 18D0625-01 Prepared & Analyzed: 04/26/2018								
Nitrogen, Nitrate (As N)	5.0	0.50	mg/L	5.000	0.46	92	80-120	
Nitrogen, Nitrite (As N)	2.2	0.10	mg/L	2.500	ND	88	80-120	
Matrix Spike (1804245-MS3)								
Source: 18D0614-01RE1 Prepared & Analyzed: 04/26/2018								
Chloride	17		mg/L	12.50	6.4	88	80-120	
Sulfate	28		mg/L	12.50	18	85	80-120	
Matrix Spike Dup (1804245-MSD1)								
Source: 18D0613-08 Prepared & Analyzed: 04/25/2018								
Fluoride	3.7	0.50	mg/L	2.000	1.7	100	80-120	0.4
Nitrogen, Nitrate (As N)	4.7	0.50	mg/L	5.000	0.22	90	80-120	0.6
Matrix Spike Dup (1804245-MSD2)								
Source: 18D0625-01 Prepared & Analyzed: 04/26/2018								
Nitrogen, Nitrate (As N)	5.1	0.50	mg/L	5.000	0.46	92	80-120	0.2
Nitrogen, Nitrite (As N)	2.2	0.10	mg/L	2.500	ND	88	80-120	0.4
Matrix Spike Dup (1804245-MSD3)								
Source: 18D0614-01RE1 Prepared & Analyzed: 04/26/2018								
Chloride	18		mg/L	12.50	6.4	89	80-120	0.6
Sulfate	29		mg/L	12.50	18	86	80-120	0.6

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ANALYTICAL REPORT

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Client Project/Site: 18D0619

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Results relate only to the items tested and the sample(s) as received by the laboratory.

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Certification Summary	12
Method Summary	13
Chain of Custody	14
Receipt Checklists	15

Definitions/Glossary

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
Q9	Insufficient sample received to meet method QC requirements.

Glossary

Abbreviation **These commonly used abbreviations may or may not be present in this report.**

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Job ID: 550-101943-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative 550-101943-1

Comments

No additional comments.

Receipt

The sample was received on 4/27/2018 10:50 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.8° C.

GC Semi VOA

Method(s) 8015D: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD) associated with preparation batch 550-145985 and analytical batch 550-146884. Affected samples have been added a Q9 qualifier.
18D0619-01 (550-101943-1)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep

Method(s) 3510C: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with 3510C.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-101943-1	18D0619-01	Water	04/23/18 15:55	04/27/18 10:50

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TestAmerica Phoenix

Detection Summary

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Client Sample ID: 18D0619-01

Lab Sample ID: 550-101943-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
ORO (C22-C32)	0.21	Q9	0.20	mg/L	1		8015D	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

Client Sample Results

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Client Sample ID: 18D0619-01

Lab Sample ID: 550-101943-1

Matrix: Water

Date Collected: 04/23/18 15:55
Date Received: 04/27/18 10:50

Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
ORO (C22-C32)	0.21	Q9	0.20	mg/L	04/30/18 14:16	05/10/18 23:29		1
DRO (C10-C22)	ND	Q9	0.10	mg/L	04/30/18 14:16	05/10/18 23:29		1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
<i>o-Terphenyl (Surr)</i>	79		10 - 150			04/30/18 14:16	05/10/18 23:29	1

Surrogate Summary

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Method: 8015D - Diesel Range Organics (DRO) (GC)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)				
Lab Sample ID	Client Sample ID	OTPH				
		(10-150)				
550-101943-1	18D0619-01	79				
LCS 550-145985/2-A	Lab Control Sample	79				
LCSD 550-145985/3-A	Lab Control Sample Dup	79				
MB 550-145985/1-A	Method Blank	65				

Surrogate Legend

OTPH = o-Terphenyl (Surr)

QC Sample Results

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Method: 8015D - Diesel Range Organics (DRO) (GC)

Lab Sample ID: MB 550-145985/1-A

Matrix: Water

Analysis Batch: 146884

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 145985

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
ORO (C22-C32)	ND		0.20	mg/L		04/30/18 14:15	05/11/18 11:16	1
DRO (C10-C22)	ND		0.10	mg/L		04/30/18 14:15	05/11/18 11:16	1
Surrogate	MB %Recovery	MB Qualifier	Limits			Prepared	Analyzed	Dil Fac
<i>o-Terphenyl (Surr)</i>	65		10 - 150			04/30/18 14:15	05/11/18 11:16	1

Lab Sample ID: LCS 550-145985/2-A

Matrix: Water

Analysis Batch: 146884

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 145985

Analyte		Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec.	
ORO (C22-C32)		1.60	1.59		mg/L		99	69 - 107
DRO (C10-C22)		0.400	0.450		mg/L		113	42 - 133
Surrogate		LCS %Recovery	LCS Qualifier	Limits				Limits
<i>o-Terphenyl (Surr)</i>		79		10 - 150				

Lab Sample ID: LCSD 550-145985/3-A

Matrix: Water

Analysis Batch: 146884

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 145985

Analyte		Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec.		RPD	
ORO (C22-C32)		1.60	1.59		mg/L		100	69 - 107	0	20
DRO (C10-C22)		0.400	0.447		mg/L		112	42 - 133	1	22
Surrogate		LCSD %Recovery	LCSD Qualifier	Limits				Limits	RPD	Limit
<i>o-Terphenyl (Surr)</i>		79		10 - 150						

TestAmerica Phoenix

QC Association Summary

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

GC Semi VOA

Prep Batch: 145985

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-101943-1	18D0619-01	Total/NA	Water	3510C	5
MB 550-145985/1-A	Method Blank	Total/NA	Water	3510C	6
LCS 550-145985/2-A	Lab Control Sample	Total/NA	Water	3510C	7
LCSD 550-145985/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	8

Analysis Batch: 146884

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-101943-1	18D0619-01	Total/NA	Water	8015D	145985
MB 550-145985/1-A	Method Blank	Total/NA	Water	8015D	145985
LCS 550-145985/2-A	Lab Control Sample	Total/NA	Water	8015D	145985
LCSD 550-145985/3-A	Lab Control Sample Dup	Total/NA	Water	8015D	145985

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Lab Chronicle

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Client Sample ID: 18D0619-01

Lab Sample ID: 550-101943-1

Matrix: Water

Date Collected: 04/23/18 15:55

Date Received: 04/27/18 10:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			145985	04/30/18 14:16	REM	TAL PHX
Total/NA	Analysis	8015D		1	146884	05/10/18 23:29	TC1	TAL PHX

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

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TestAmerica Phoenix

Accreditation/Certification Summary

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Laboratory: TestAmerica Phoenix

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-18
Analysis Method	Prep Method	Matrix	Analyte	

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TestAmerica Phoenix

Method Summary

Client: Turner Laboratories, Inc.
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Method	Method Description	Protocol	Laboratory
8015D	Diesel Range Organics (DRO) (GC)	SW846	TAL PHX
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	TAL PHX

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

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TestAmerica Phoenix

SUBCONTRACT ORDER

Turner Laboratories, Inc.

18D0619
101943SENDING LABORATORY:

Turner Laboratories, Inc.
 2445 N. Coyote Drive, Ste #104
 Tucson, AZ 85745
 Phone: 520.882.5880
 Fax: 520.882.9788
 Project Manager: Kevin Brim

RECEIVING LABORATORY:

TestAmerica Phoenix
 4625 East Cotton Center Boulevard Suite 189
 Phoenix, AZ 85540
 Phone :(602) 437-3340
 Fax:
 Please CC Kevin Brim Kbrim@turnerlabs.com

Analysis	Expires	Laboratory ID	Comments
-01			
Sample ID: 18D0619-01 Drinking Water Sampled:04/23/2018 15:55	04/30/2018 15:55	8015D Sub	8015D DRO and ORO Paramters Only
Containers Supplied:			

8015D Sub
 o-Terphenyl
 C10-C32 (Total)
 C22-C32 (Oil Range Organics)
 C10-C22 (Diesel Range Organics)
 C6-C10 (Gasoline Range Organics)



TA-PHX

3,8' L UPS GR

Released By

41263118

Date

Received By

Released By

Date

Received By

Date

Login Sample Receipt Checklist

Client: Turner Laboratories, Inc.

Job Number: 550-101943-1

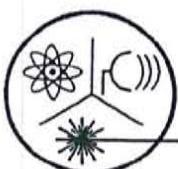
Login Number: 101943

List Source: TestAmerica Phoenix

List Number: 1

Creator: Gravlin, Andrea

Question	Answer	Comment	
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True		1
The cooler's custody seal, if present, is intact.	True		2
Sample custody seals, if present, are intact.	True		3
The cooler or samples do not appear to have been compromised or tampered with.	True		4
Samples were received on ice.	True		5
Cooler Temperature is acceptable.	True		6
Cooler Temperature is recorded.	True		7
COC is present.	True		8
COC is filled out in ink and legible.	True		9
COC is filled out with all pertinent information.	True		10
Is the Field Sampler's name present on COC?	True		11
There are no discrepancies between the containers received and the COC.	True		12
Samples are received within Holding Time (excluding tests with immediate HTs)	True		13
Sample containers have legible labels.	True		14
Containers are not broken or leaking.	True		15
Sample collection date/times are provided.	True		
Appropriate sample containers are used.	True		
Sample bottles are completely filled.	True		
Sample Preservation Verified.	True		
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True		
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True		
Multiphasic samples are not present.	True		
Samples do not require splitting or compositing.	True		
Residual Chlorine Checked.	False	Check done at department level as required.	



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121

Website: www.radsafe.com

(480) 897-9459

FAX (480) 892-5446

Radiochemical Activity in Water (pCi/L)

Turner Laboratories
2445 N. Coyote Drive, Ste. 104
Tucson, AZ 85745

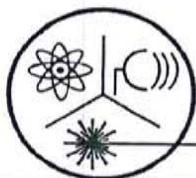
Sampling Date: April 23, 2018
Sample Received: May 01, 2018
Analysis Completed: May 22, 2018

Sample ID	Gross Alpha Activity Method 600/00-02 (pCi/L)	Uranium Activity Method ASTM D6239 (pCi/L)	Adjusted Gross Alpha (pCi/L)	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
18D0619-01	17.7 ± 0.9	12.9 ± 1.2	4.8 ± 1.5	3.1 ± 0.3	3.1 ± 0.4	6.2 ± 0.5

Date of Analysis	5/2/2018	5/21/2018	5/21/2018	5/4/2018	5/4/2018	5/4/2018
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Alt 2. retest

Robert L. Metzger, Ph.D., C.H.P. Date _____
Laboratory License Number AZ0462



Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121

Website: www.radsafe.com

(480) 897-9459

FAX (480) 892-5446

Isotopic Uranium Analysis

Turner Laboratories
2445 N. Coyote Drive, Ste. 104
Tucson, AZ 85745

Sampling Date: April 23, 2018

Sample Received: May 01, 2018

Uranium Analysis Date: May 21, 2018

Sample No.	^{238}U	^{235}U	^{234}U	Total	
18D0619-01	6.0 ± 0.6	0.280 ± 0.004	6.6 ± 0.6	12.9 ± 1.2	Activity (pCi/L)
	17.9 ± 1.7	0.131 ± 0.002	0.00106 ± 0.00010	18.0 ± 1.7	Content ($\mu\text{g}/\text{L}$)
Comments:					

Metzger
Robert L. Metzger, Ph.D., C.H.P. 5/22/2018
Date
Laboratory License Number AZ0462

Arizona Department of Environmental Quality
Drinking Water Radionuclides-Adjusted Gross Alpha, Radium 226 & 228, Uranium Analysis Report
 Samples To Be Taken At Entry Point Into Distribution System (EPDS) Only

PWS ID#: AZ04 _____ PWS Name: _____

April 23, 2018 15:55 (24 hour clock)
 Sample Date Sample Time Owner/Contact Person

Owner/Contact Fax Number Owner/Contact Phone Number

Sample Collection Point
 EPDS # _____

Compliance Sample Type:

- Reduced Monitoring
- Quarterly
- Composite of four quarterly samples

Date Q1 collected: _____
 Date Q2 collected: _____
 Date Q3 collected: _____
 Date Q4 collected: _____

*****RADIOCHEMICAL ANALYSIS*****

>>>To be filled out by laboratory personnel<<<

*****Combined Uranium must be reported in micrograms per liter*****

Analysis Method	MCL	Reporting Limit	Contaminant Name	Cont. Code	Analyses Run Date	Result	Exceed MCL
	15 pCi/L		Adjusted Gross Alpha	4000	5/21/2018	4.8 ± 1.5	
600/00-02		3 pCi/L	Gross Alpha	4002	5/2/2018	17.7 ± 0.9	
7500 - Rn			Radon	4004			
ASTM D6239	30 µg/L	1 µg/L	Combined Uranium	4006	5/21/2018	18.0 ± 1.7 µg/L	
			Uranium 234	4007	5/21/2018	0.00106 ± 0.00010	
			Uranium 235	4008	5/21/2018	0.131 ± 0.002	
			Uranium 238	4009	5/21/2018	17.9 ± 1.7	
	5 pCi/L	1 pCi/L	Combined Radium (226,228)	4010	5/4/2018	6.2 ± 0.5	X
GammaRay HPGE		1 pCi/L	Radium 226	4020	5/4/2018	3.1 ± 0.3	
GammaRay HPGE		1 pCi/L	Radium 228	4030	5/4/2018	3.1 ± 0.4	

*****LABORATORY INFORMATION*****

>>>To be filled out by laboratory personnel<<<

Specimen Number: RSE60312

Lab ID Number: AZ0462

Lab Name: Radiation Safety Engineering, Inc.

Printed Name and Phone Number of Laboratory Contact: Robert L. Metzger, Ph.D., C.H.P. (480) 897-9459

Comments: 18D0619-01

Authorized Signature: *Robert L. Metzger*

Date Public Water System Notified:

SUBCONTRACT ORDER

Turner Laboratories, Inc.

18D0619SENDING LABORATORY:

Turner Laboratories, Inc.
 2445 N. Coyote Drive, Ste #104
 Tucson, AZ 85745
 Phone: 520.882.5880
 Fax: 520.882.9788
 Project Manager: Kevin Brim

RECEIVING LABORATORY:

Radiation Safety Engineering, Inc.
 3245 N. Washington St.
 Chandler, AZ 85225-1121
 Phone : (480) 897-9459
 Fax: (480) 892-5446
 Please CC Kevin Brim Kbrim@turnerlabs.com

Analysis	Expires	Laboratory ID	Comments
Sample ID: 18D0619-01 Drinking Water Sampled:04/23/2018 15:55			
Radiochemistry, Gross Alpha	10/20/2018 15:55		Analyze Uranium and Adjusted Alpha if G. Alpha is > 12
Radiochemistry, Radium 226/228	05/23/2018 15:55		
<i>Containers Supplied:</i>			

*# 60312**[Signature]*
Released By4/30/18
Date16:00
ups

Received By

4/30/18
Date

16:00

Released By

Date

Received By

Date

APPENDIX D

Well Completion Documentation

PIPE TALLY

Project Name.: FCI PTF	Project No.: 129687-007
Well No.: R-07	Date: 11/19/17 - 11/20/17
Location: Florence, AZ	Pipe Tally for: Overburden casing
Total Depth: 506 503	Geologist: S. Heisel Z. Smith

Type of Connections: Welded T+C Flush Thread Other

Notes:
LCS Fusion bond = Polyethylene
LCS = low carbon steel
0.312" wall thickness
14" OD

SUMMARY OF TALLY	
Total Length tallied:	523.3
Casing Stick-Up:	2.3
Length of Casing Cut-Off:	21.0 18.9
Bottom of Well:	523 500 502.1
Screened Interval:	—
Total Screen in Hole:	—

Centralizers every 40' starting at bottom of second casting

Sensor Types:	Annular Conductivity Device (ACD), installed as pairs with 3 ft spacing
	Conductivity Sensor (CS) 4 sensors with sing lead 20 ft spacing
	Electrical Resistivity Tomography (ERT)

LCS casing now has bereled ends

HALEY
ALDRICH

$SW = 105.8 \text{ bbls} = 224 \text{ y}^3$
Niles Slurry

ESTIMATED ANNULAR MATERIAL RECORD

Project Name: FCI PTF
Well No.: R-07

Project #: 121687-007
Geologist: Z. Smith

Date: 11/14/17

Total Depth of Borehole [T]: 506 feet
Borehole Diameter [D]: 20 inches
Screen Length [L_s]: — feet
Screen Diameter [d_s]: — inches
Casing Length [L_c]: 500 feet
Casing Diameter [d_c]: 14 inches

ANNULAR VOLUME CALCULATIONS

Total Cased Depth: 500 feet
Rat Hole Volume [$R=(D^2)$] $0.005454 * L_r$: 13.09 Ft^3
Rat Hole Length [L_r]: 6 feet
Camera Tube Length [L_{ct}]: — feet
Camera Tube Diameter [d_{ct}]: — inches

Screen Annular Volume (A_s): $(D^2 - d_s^2) 0.005454 =$

— $\text{Ft}^3/\text{Lin. Ft}$

Casing Annular Volume (A_c): $(D^2 - d_c^2) 0.005454 =$

1.11 $\text{Ft}^3/\text{Lin. Ft}$

Casing/Cam.Tube Annular Volume (A_{ct+ct}): $(D^2 - d_c^2 - d_{ct}^2) 0.005454 =$

— $\text{Ft}^3/\text{Lin. Ft}$

EQUATIONS

2,700 lbs. Silica Sand = 1 cubic yard = 27 cubic feet

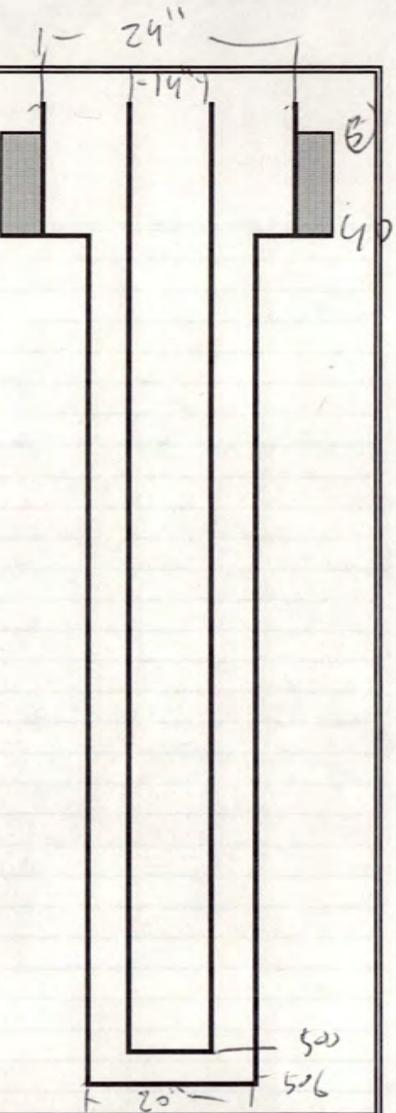
Bentonite Sack = 0.69 ft^3

¹ Volume of bag (Ft^3) = bag weight/100

Silica Sand Super Sack = 3000 lbs.

² Calculated depth = Previous Calculated depth - (v/A)

No.	✓	Weight of Bag (lbs.)	Volume of Bag ¹ (ft^3)	Total Vol. of Bags (ft^3)	Calculated Depth ² (ft bls)	Tagged Depth (ft bls)	Comments
1	✓	—	—	1125	— ft	Surface	Type V Concrete ~145 ft



$$V_{col} = 13.0896 + (24^2 - 14^2)(40)(0.005454) + (20^2 - 14^2)(500 - 40)(0.005454)$$

$$V_{col} = 13.94 \text{ ft}^3 + 82.9 \text{ ft}^3 + 511.4 \text{ ft}^3 = 608.9 \text{ ft}^3 = 22.54 \text{ y}^3 = 108.966 \text{ bbls}$$

Pumped Slurry = ~~1729.4661~~ 129.4 BBL

Pump'd V (2/3 of calculated) = ~~≈ 1229~~
119 1/2

*transcribed from Original Pipe Tally Page 1

Page 1 of 2

PIPE TALLY

Project Name: FCL P75	Project No.: 129687-007
Well No.: D7	Date:
Location: Florence, AZ	Pipe Tally for:
Total Depth:	Geologist:

Type of Connections: Welded T+C Flush Thread Other

Pipe	✓	Length (ft)	Length Σ (ft)	Pipe Type	Dist. from sensor bottom to bottom of pipe (feet)	Sensor Type (ACD, CS, ERT)	Sensor ID	Wire Lead ID	Depth of Sensor (feet bgs)
1	✓	0.36	0.36	End cap					
2	★	20.2	20.39	SCH80 PVC Screen					
3	✓	20.02	40.40		12.3	ERT			
4	★	20.02	60.42						
5	✓	20.03	80.45						
6	★	20.03	100.47		11.6	ERT			
7	✓	20.02	120.49						
8	★	20.02	140.49						
9	✓	20.01	160.52		11.7	ERT			
10	★	20.03	180.55						
11	✓	20.02	200.57						
12	★	20.01	220.58		11.7	ERT			
13	✓	20.04	240.62						
14	★	20.01	260.63						
15	✓	20.04	280.67		11.7	ERT			
16	★	20.02	300.69						
17	✓	19.97	320.66	SCH80 PVC Blank					
18	★	20.04	340.70	SCH80 PVC Screen	11.6	ERT			
19	✓	20.02	360.72						
20	★	20.02	380.74						
21	✓	20.03	400.77		11.6	ERT			
22	★	20.01	420.78						
23	✓	20.02	440.79						
24	★	20.01	460.81		10.9	ERT			
25	✓	20.02	480.83						
26	★	20.03	500.85						
27	✓	20.02	520.87		11.7	ERT	4		
28	★	20.03	540.89						
29	✓	19.95	560.84	SCH80 PVC Blank					
30	★	20.03	580.86	SCH80 PVC Screen	11.7	ERT	3	Transducer #	

0.050

Notes:

A centralizer is rung 46' @ bottom of pipe

1st ERT sensor measured from top
of bottom of yellow part

ERT

All other sensors measured from
bottom of yellow

SUMMARY OF TALLY	
Total Length tallied:	1205.48
Casing Stick-Up:	-
Length of Casing Cut-Off:	-
Bottom of Well:	1204.28
Screened Interval:	-
Total Screen in Hole:	-

Sensor Types: Annular Conductivity Device (ACD), installed as pairs with 3 ft spacing
Conductivity Sensor (CS) single sensor with sing lead 20 ft spacing
Operational Monitoring Sensor (OMS)

* Broken Transducer 8.43' from bottom of pipe

S/N: 1700474

Model #: 3404HD - 3.25 MPa

0074

HALEY
ALDRICH

Sensor cable SN: 0113497304-1-65 (Hydrogeophysics 5123)

HALEY

PIPE TALLY

Project Name: FLI PPG	Project No.: 1B1687-007
Well No.: B-67	Date: 1/16/18
Location: Florida, A2	Pipe Tally for:
Total Depth:	Geologist: S. Hensel, S. Kanney
Type of Connections: <input type="checkbox"/> Welded <input type="checkbox"/> T+C <input type="checkbox"/> Flush Thread <input type="checkbox"/> Other	

Pipe	✓	Length (ft)	Length Σ (ft)	Pipe Type	Dist. from sensor bottom to bottom of pipe (feet)	Sensor Type (ACD, CS, ERT)	Sensor ID	Wire Lead ID	Depth of Sensor (feet bgs)
31	✓	20.03	600.49	3" PVC					
32	✗	20.03	620.70	3" PVC					
33	✗	20.03	640.72		1162	ERT	222		
34	✗	20.03	660.75						
35	✓	20.02	680.77						
36	✓	0.5	681.47	PVC → Fiber glass					
37	✗	21.04	710.51	5" Fiberglass	11-27	ERT	111		
38	✗	21.07	731.58						
39	✗	21.10	752.7						
40	✓	21.10	773.78						
41	✗	21.12	826.92						
42	✗	21.23	856.14						
43	✗	21.07	885.21						
44	✓	21.06	914.27						
45	✗	21.17	943.44						
46	✗	21.10	972.54						
47	✓	21.10	1001.64						
48	✗	21.00	1030.64						
49	✗	21.07	1059.61						
50	✗	21.03	1088.67						
51	✓	21.25	1117.92						
52	✗	21.24	1147.16						
53	✗	21.17	1176.33						
54	✗	21.15	1204.28						
55									
56									
57									
58									
59									
60									

Notes:
 # centralizer every 40' @ bottom of
 pipe
 # centralizer every 40' # = 15m
 from bottom of pipe
 # from top of pvc → fiber glass 14.25 m after

SUMMARY OF TALLY	
Total Length tallied:	1205.4Y
Casing Stick-Up:	1
Length of Casing Cut-Off:	-
Bottom of Well:	1204.28
Screened Interval:	
Total Screen in Hole:	
Sensor Types:	Annular Conductivity Device (ACD), installed as pairs with 3 ft spacing Conductivity Sensor (CS) 4 sensors with sing lead 20 ft spacing Electrical Resistivity Tomography (ERT)

HALEY
ALDRICH

Casing Layout

Project Name.:	Florence Copper INC		Project No.:	129687-007	
Well No.:	R-07		Date:	1.6.18	
Location:	Florence AZ		Layout for:	Well Casing Install	
Total Depth:	1204.28		Geologist:	S. Hensel; S. Kaney	
Pipe Length	Depth BGS		Pipe Length	Depth BGS	Pipe Length
20.02	23	763.48	29.10	46	231.74
					260.84
20.01	22	783.50	29.17	45	290.01
					319.07
20.03	21	803.51	29.06	44	348.14
					377.36
20.02	20	823.54	29.07	43	406.48
					435.58
20.02	19	843.56	29.22	42	464.68
					493.77
20.04	18	863.58	29.12	41	522.81
					523.31
19.97	17	883.62	29.10	40	543.33
					563.36
20.02	16	903.59	29.10	39	583.38
					603.40
20.04	15	923.61	29.09	38	623.42
					643.44
20.04	14	943.65	29.04	37	663.39
					683.41
20.01	13	963.66	0.50	36	703.43
					723.45
20.04	12	983.70	20.02	35	743.47
					763.48
20.01	11	1003.71	20.02	34	
20.02	10	1023.73	20.02	33	
20.01	9	1043.76	20.02	32	
20.02	8	1063.77	20.02	31	
20.02	7	1083.79	20.02	30	
20.02	6	1103.81	19.95	29	
20.02	5	1123.83	20.02	28	
20.03	4	1143.86	20.02	27	
20.02	3	1163.88	20.02	26	
20.02	2	1183.90	20.02	25	
20.02	1	1203.92	20.01	24	
0.36		1204.28			

Notes:

SENSOR DETAILS				
Sensor Type	Sensor ID	Pipe #	Distance from Bottom of Sensor to Bottom of Pipe	Depth of Sensor (BGS)
ERT	12	3	12.20	1171.70
ERT	11	6	11.60	1112.23
ERT	10	9	11.70	1052.07
ERT	9	12	11.70	992.01
ERT	8	15	11.70	931.95
ERT	7	18	11.60	872.02
ERT	6	21	11.60	811.94
ERT	5	24	10.90	752.58
ERT	4	27	11.70	691.73
ERT	3	30	11.70	631.74
ERT	2	33	11.62	571.76
ERT	1	37	11.20	511.61
			#REF!	#REF!
			#REF!	#REF!
			#REF!	#REF!

Pipe Number	Type
1	SS End Cap
2 -16	PVC SCH 80 Screen 0.020
17	PVC SCH 80 Blank
18-28	PVC SCH 80 Screen 0.020
29	PVC SCH 80 Blank
30-35	PVC SCH 80 Screen 0.020
36	PVC/FRP Adaptor
36-54	FRP

ESTIMATED ANNULAR MATERIAL RECORD

Project Name: FCI PTI
Well No.: 6-07
Project #: 129687-007
Geologist: S. Kersey

Date: 1/6/18

ANNULAR VOLUME CALCULATIONS

Total Depth of Borehole [T]:	<u>1244</u>	feet	Total Cased Depth:	<u>1204.2</u>	feet
Borehole Diameter [D]:	<u>12.25</u>	inches	Rat Hole Volume [$R=(D^2) 0.005454 * L$]:	<u>32.74</u>	ft^3
Screen Length [L _s]:	<u>640</u>	feet	Rat Hole Length [L _r]:	<u>40</u>	feet
Screen Diameter [d _s]:	<u>5</u>	inches	Camera Tube Length [L _{ct}]:	<u>—</u>	feet
Casing Length [L _c]:	<u>544</u>	feet	Camera Tube Diameter [d _{ct}]:	<u>—</u>	inches
Casing Diameter [d _c]:	<u>5</u>	inches			

Screen Annular Volume (A_s): $(D^2-d_s^2) 0.005454 = \frac{0.45}{0.45}$ $\text{ft}^3/\text{Lin. Ft}$

Casing Annular Volume (A_c): $(D^2-d_c^2) 0.005454 = \frac{0.45}{0.45}$ $\text{ft}^3/\text{Lin. Ft}$

Casing/Cam. Tube Annular Volume (A_{c+ct}): $(D^2-d_c^2-d_{ct}^2) 0.005454 = \frac{0.45}{0.45}$ $\text{ft}^3/\text{Lin. Ft}$

EQUATIONS

2,700 lbs. Silica Sand = 1 cubic yard = 27 cubic feet

¹ Volume of bag (ft^3) = bag weight/100

² Calculated depth = Previous Calculated depth - (V/A)

No.	✓	Weight of Bag (lbs.)	Volume of Bag ¹ (ft ³)	Total Vol. of Bags (ft ³)	Calculated Depth ² (ft bbls)	Tagged Depth (ft bbls)	Comments
1	✓	3000	36	30	1215	—	Surface
2	✓	3000	36	66	1155	1150	#6
3	✓	3000	36	90	1132	1149	#6
4	✓	2662	32	120	1123*	1146	#6
5	✓	2800	32	150	1144*	1144	#6
6	✓	3000	30	180	1105*	1129	#6 (Fernie after tag. Trend: 2105')
7	✓	3000	30	210	1059	1129	#6 Pull (1) tremie bottom (1059')

Calculated depth estimated using volume log, 30 ft³ = 1.11 yds³
* using borehole diameter of 25" based on volume log, 30 ft³ → 9.3 in ft

ESTIMATED ANNULAR MATERIAL RECORD (Continued)

Project Name: FCI PTF

Project No.: 129687

Date: 1/6/87

-

Geologist: S. Harvey, S. Schuel, E. Smith

Well No.:	Q -0-7	Weight of Bag (lbs.)	Volume of Bag ¹ (y) (ft ³)	Total Vol. of Bags (ft ³)	Calculated Depth ² (ft lbs)	Tagged Depth (ft lbs)	Comments
8	✓	3000	32	340	1013	1043	#6 sand, tremie pulled to bottom 1027
9	✓	3000	32	270	967	1017	#6 sand, tremie pulled to bottom 994
10	✓	3000	32	300	921	975	#6 sand, tremie pulled to bottom 93267
11	✓	3000	32	330	875	915	#6 sand, tremie pulled to bottom 93267
12	✓	66.7	0.667	436	855	930	#6 sand, tremie pulled to bottom 93267
13	✓	1500	15	345	852	906	#6 sand, tremie pulled to bottom 96149
14	-	-	-	-	-	903	Surfacing ~1010 - 1020 for 30 min. (8x)
15	-	-	-	-	-	903	Surfacing ~1010 - 1020 for 30 min. (10x)
16	✓	66.7	0.667	348.3	847	904	#6 sand, tremie pulled to bottom 93267
17	✓	66.7	0.667	754.3	841	-	#6 sand, tremie pulled to bottom 900 - 1020 for 20 min. (10x)
18	-	-	-	-	-	902	Surfacing ~1010 - 1020 for 20 min. (10x)
19	✓	66.7	0.667	355.6	836	901	#6 sand, tremie pulled to bottom 93267
20	✓	66.7	0.667	258.7	822	896	#6 sand, tremie pulled to bottom 93267
21	-	-	-	-	-	894	Surfacing ~900 - 1020 (4x)
22	-	-	-	-	-	896	#6 sand, tremie pulled to bottom 900 - 1020 (4x)
23	-	50	0.5	363.7	824	892.5	#6 sand, tremie pulled to bottom 900 - 1020 (4x)
24	✓	50	0.5	265.2	804	895.5	#6 sand, tremie pulled to bottom 900 - 1020 (4x)
25	✓	3000	30	275.2	873.5	919	#6 sand, tremie pulled to bottom 93267
26	-	-	-	-	-	871	Perforated bottom 93267
27	✓	3000	30	465.2	907.5	-	#6 sand, tremie pulled to bottom 93267
28	✓	3000	30	435.2	781	-	#6 sand, tremie pulled to bottom 745.75, then 735.75
29	✓	3000	30	465.2	735.5	-	#6 sand, tremie pulled to bottom 745.75

Notes:

Project Name: SCT PTF
Well No.: Z-07

ESTIMATED ANNULAR MATERIAL RECORD (Continued)

Project No.: 1214667-007
Date: 11/6/18 - 11/9/18

S. Hensel Z. Smith

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Well No.: R-57 Date: 6/18/01 Comments:

No	Weight	Volume	Total Vol	Calculated	Tagged

No.	Weight of Bag (lbs.)	Volume of Bag ¹ (v) (ft ³)	Weight of Bags (lbs.)	Total Vol. of Bag ¹ (V) (ft ³)	Depth ² (ft lbs)	Depth ² (ft lbs)	Depth (ft lbs)
23	✓ 3000	30	475-2	547-5	(0.9)	#6 sand, trimm. pulled to	238.12
24	✓ 1500	15	510-2	667	(0.4)	#6 sand, trimm. pulled to	650.69
-	-	-	-	-	-	-	-
25	✓ 50	0.5	515-2	661	671	concreting	443 - 733 (0x)
26	✓ 50	0.5	517-7	658	623	#6 sand, sand bucket x 10	
27	✓ 66	-	-	-	-	#6 sand, sand bucket x 5	
-	-	-	-	-	-	#6 sand, 5 gal bucket x 5	
27	✓ 66	0.6	518-3	658	658	swabbing	783 - 623 (10x)
-	-	-	-	-	658	#6 sand	5 gal bucket x 10
28	✓ 50	0.5	523-3	650.5	652	60 sand	783 - 663 (10x)
29	✓ 50	0.5	525-3	644	650	60 sand	50 16 bags X 10
30	✓ 50	0.5	526.3	6465	648	60 sand	50 16 bags X 10
31	✓ 3000	30	586.3	558	578	460	50 16 bags X 2
32	✓ 3000	30	616.3	533	537	#6 sand, trimm. pulled to	587.85
33	✓ 1000	10	626.3	522	528	#6 sand, trimm. pulled to	535.645
34	✓ 50	0.5	631-3	-	-	✓ 1/2 sand sack of #6 sand, trimm. pulled to	494.45
34	✓ 66.6	0.666	632	516	522	10 ft 5 gallon buckets of #6 sand	
35	✓ 66.6	0.666	635.7	518	514	4X u n u u u u u u	
36	✓ 66.6	0.666	637.3	518	518	7X u u u u u u u u	
-	-	-	-	-	-	-	-
37	✓ 50	3.5	3410.8	513	513	Scrub 445 - 520 ft BLS	520
38	✓ 66.6	342	3418.512	512	512	5016 bags of #6 sand (X7)	
						1.5 gal/loc bucket of Batsonite	

Notes:

K:\Templates\Field Forms\Well Inst & Testing Forms.xls

$$Shw = 105.8 \text{ ft/s} = 224 \frac{\text{ft}}{\text{s}}$$

Niles Slurry

ESTIMATED ANNULAR MATERIAL RECORD

Project Name: FCI #11 Well No.: R-37	Project #: 121687-207 Geologist: Z. Sain	Date: 11/14/17					
ANNULAR VOLUME CALCULATIONS							
Total Depth of Borehole [T]:	<u>590</u> feet	Total Cased Depth:					
Borehole Diameter [D]:	<u>20</u> inches	Rat Hole Volume [$R=(D^2) 0.005454 * L$]:					
Screen Length [L_s]:	<u>-</u> feet	Rat Hole Length [L]:					
Screen Diameter [d_s]:	<u>-</u> inches	Camera Tube Length [L_c]:					
Casing Length [L_c]:	<u>520</u> feet	Camera Tube Diameter [d_c]:					
Casing Diameter [d_c]:	<u>14</u> inches						
Screen Annular Volume (A_s): ($D^2 - d_s^2$) 0.005454 =	<u>—</u> $\text{Ft}^3/\text{Lin. Ft}$						
Casing Annular Volume (A_c): ($D^2 - d_c^2$) 0.005454 =	<u>—</u> $\text{Ft}^3/\text{Lin. Ft}$						
Casing/Cam. Tube Annular Volume (A_{c+ct}): ($D^2 - d_c^2 - d_{ct}^2$) 0.005454 =	<u>—</u> $\text{Ft}^3/\text{Lin. Ft}$						
EQUATIONS							
2,700 lbs. Silica Sand = 1 cubic yard = 27 cubic feet							
¹ Volume of bag (Ft^3) = bag weight/100							
² Calculated depth = Previous Calculated depth - (V/A)							
No.	✓	Weight of Bag (lbs.)	Volume of Bag ¹ (Ft^3)	Total Vol. of Bags (ft^3)	Calculated Depth ² (ft/lbs)	Tagged Depth (ft/lbs)	Comments
1	✓	<u>—</u>	<u>—</u>	<u>145</u>	<u>26 ft</u>	<u>26 ft</u>	<u>Line V Cnstant ~14.5 ft/lb</u>

$$V_{calc} = 13.0896 + (292 - 142)(140)(0.005454) + (20^2 - 14^2)(500 - 40)(0.005454)$$

$$V_{calc} = 13.0896 + 82.944^3 + 511.4044^3 = 678.944^3 = 22,544 \text{ ft}^3 = 108.466 \text{ ft}$$

~~$$P_{\text{total}} = P_{\text{bottom}} = 129.444 \text{ ft}$$~~

$$P_{\text{total}} V (\text{ft}^3) \text{ of calculated} = \approx 122.9 \text{ ft}$$



58778424

Plant:	Begin Loading:	To Job:	Arrive Job:	Start Unload:	Finish Unload:	Leave Job:	Return Plant:
	10:00						

Customer Code: Customer Name: Customer Job Number: Order Code / Date:
 Project Code: Project Name: Project P.O. Number: Order P.O. Number:
 Ticket Date: Delivery Address: Map Page: Map/Row/Column:
 Delivery Instructions: ROTARY HOPPER DUMPING

Dispatcher:

Ticket Number:

Due On Job:	Slump:	Truck Number:	Driver Number:	Driver Name:	End Use:
-------------	--------	---------------	----------------	--------------	----------

LOAD QUANTITY	CUMULATIVE QUANTITY	ORDERED QUANTITY	MATERIAL CODE	PRODUCTION DESCRIPTION	UOM	UNIT PRICE	AMOUNT
---------------	---------------------	------------------	---------------	------------------------	-----	------------	--------

<input type="checkbox"/> Cash <input type="checkbox"/> Check <input type="checkbox"/> Charge	Check # / Auth Code: _____ Signature of Driver Receiving Cash: _____	Cash Received: _____ Total COD Order Amount to Collect Without Standby Charges: _____	
Comments:		WATER ADDED: _____ GAL YARDS IN DRUM: _____ WHEN ADDED. CURB LINE CROSSED AT OWNER'S/AGENT'S REQUEST: <input type="checkbox"/> LOAD WAS TESTED BY: _____	
Notice: Our drivers will make every effort to place materials where the customer designates, but the Company assumes no responsibility for damages inside curb or property line. Customer agrees to the terms of sale and delivery and accepts concrete as is. Due to important factors which are out of our control after delivery, this Company will not accept any responsibility for the finished results. No credit for returned concrete. Buyers exceptions and claims shall be deemed waived unless made to us in writing within one business day after the receipt of materials.			

SPECIAL TERMS: Any water added is at customers own risk. If water is added on job, concrete strength is no longer guaranteed. WARNING: Product may cause skin and/or eye irritation. CAUTION: Material may be hazardous to your safety and health. Please refer to the backside of this ticket for important safety handling information, and to the material safety data sheets for additional information.
 AUTHORIZED SIGNATURE:
 (X) _____

Truck 1886	Driver 410322	User operator	Disp 44350101	Ticket Num	Time 12:10	Date 10/17/17		
Load 8.00	Size CYDS	Mix 1333049	Code	Returned	Qty	Mix Age	Seq D	Load ID 18249

Material CEMENT	Required 15840.00	Batched lb 1013.6 gal	% Moisture	Actual 1012.3 gal	Wat	Trim
WATER						gal

Actual Load Slump:	24288 lb	Design W/C: 10.00 in #	Num Batches: 0.534	Water/Cement: A	0.533	Actual 1012.3 gal	To Add: 1.3 gal	Manual	12:10:21
--------------------------	----------	---------------------------	-----------------------	--------------------	-------	----------------------	--------------------	--------	----------

Load Completed Load Time: : ---Tares-----

CEM SCALE	B: 1	ST: 0	lb	ET: 10	lb	WAT SCALE	B: 1	ST: 38
WAT SCALE	B: 2	ST: 16	lb	ET: 16	lb	CEM SCALE	B: 3	ST: 10



58776424

Plant:	Begin Loading:	To Job:	Arrive Job:	Start Unload:	Finish Unload:	Leave Job:	Return Plant:
00374103	1231						

Customer Code:	Customer Name:	Customer Job Number:	Order Code / Date:
361107	FLORENCE COPPER INC	FLORENCE WELL	10/17/17
Project Code:	Project Name:	Project P.O. Number:	Order P.O. Number:
Ticket Date:	Delivery Address:	Map Page:	Map/Row/Column:
Delivery Instructions:	MAIN GATE #S/SIDE OF HUNT HWY & W/0 FINAL PKWY BRING BATCH RECORDS & TYPE II/V CEMENT	Dispatcher:	
		Ticket Number:	44350101

Due On Job:	Slump:	Truck Number:	Driver Number:	Driver Name:	End Use:
10	11.00	5886	2	KSON, KENNETH	BLDG: OTHER

LOAD QUANTITY	CUMULATIVE QUANTITY	ORDERED QUANTITY	MATERIAL CODE	PRODUCTION DESCRIPTION	UOM	UNIT PRICE	AMOUNT
1.00	1.00	1.00	1233049	TYPE II/V CEMENT 21 BR CM/W 103 1.00 1.00 1233958 PER DAY DELIVERY	EA		

DCT 17 PM 12:31

1247818 FUEL SURCHARGE ADJ
 1202749 ENVIRONMENTAL FEE
 1572392 FREIGHT_NON_TAXABLE_ARIZONA

<input type="checkbox"/> Cash	Check # / Auth Code:	Signature of Driver Receiving Cash:	Cash Received:	Total COD Order Amount to Collect Without Standby Charges:
<input type="checkbox"/> Check				
<input type="checkbox"/> Charge				

Comments:	WATER ADDED: _____ GAL YARDS IN DRUM: _____ WHEN ADDED.
	SIGNATURE
	CURB LINE CROSSED AT OWNER'S/AGENT'S REQUEST: _____ SIGNATURE

 LOAD WAS TESTED BY: _____

Notice: Our drivers will make every effort to place materials where the customer designates, but the Company assumes no responsibility for damages inside curb or property line. Customer agrees to the terms of sale and delivery and accepts concrete as is. Due to important factors which are out of our control after delivery, this Company will not accept any responsibility for the finished results. No credit for returned concrete. Buyers exceptions and claims shall be deemed waived unless made to us in writing within one business day after the receipt of materials.

SPECIAL TERMS: Any water added is at customers own risk. If water is added on job, concrete strength is no longer guaranteed. WARNING: Product may cause skin and/or eye irritation. CAUTION: Material may be hazardous to your safety and health. Please refer to the backside of this ticket for important safety handling information, and to the material safety data sheets for additional information.

AUTHORIZED SIGNATURE: 



BASIC[®]
ENERGY SERVICES

3451 LeTourneau
Gillette, WY 82718
307-682-5258

Cementing Ticket

No. 1719

21332A

Date 11/19/17	Customer Order No. /	Sect.	Twp.	Range	Truck Called Out	On Location 3:00p	Job Began 7:00p	Job Completed 9:00p
Owner Florence Copper Mine			Contractor			Charge To Hydro Resources West		
Mailing Address			City			State		
Well No. & Form R O # 7			Place			County	Pinal	State Az.
Depth of Well	Depth of Job 500	Casting New	Size 14 3/4	Size of Hole 20	Amt. and Kind of Cement 525	(Cement Left in casing by)	Request Necessity	feel
Kind of Job Surface			Drillpipe Tubing 2 7/8	(Rotary Cable)	Truck No. 28983			
Price Reference No. 2541.00		Remarks Safety meeting water ahead 10bbls. mix 630sks cemt. class 25. @ 14.5# shutdown. wash up to pit.						
Price of Job 3825.00		<i>PS 152614</i>						
Second Stage 765.00								
Pump Truck Mileage 7,131.00								
R.U. Mileage								
Other Charges								
Total Charges 7,131.00								

Cementer Jim Lead Yield 1.38 Lead Wt 14.5
 Helper Bryan Tail Yield _____ Tail Wt _____
 District Gillette State _____
 The above job was done under supervision of the owner, operator, or his agent whose signature appears below.

Agent of contractor or operator

Sales Ticket for Materials Only

92609845

41080622



BASIC[®]
ENERGY SERVICES

3451 LeTourneau
Gillette, WY 82718
307-682-5258

Cementing Ticket

No. 1719

21364

Date 01-09-18	Customer Order No.	Sect.	Twp.	Range	Truck Called Out 14:30	On Location 15:45	Job Began 19:30	Job Completed 21:30
Owner Florance Copper Mine			Contractor Hydro Resources			Charge To Hydro West		
Mailing Address		City			State <i>101156</i>			
Well No. & Form R 07			Place copper mine			County Pinal	State AZ	
Depth of Well 1244	Depth of Job 505	<input checked="" type="radio"/> New <input type="radio"/> Used	Size 5.5	Size of Hole Amt. and Kind of Cement	20 inch	<input checked="" type="radio"/> Cement Left <input type="radio"/> in casing by	Request Necessity 0	
Kind of Job production string				Drillpipe	<input checked="" type="radio"/> Rotary	Tubing 2 7/8	Cable	Truck No. 28983

Price Reference No.	safety meeting held
Price of Job	rig up to tubing with hose and valve
Second Stage	pump 5 bbls to clear tubing
Pump Truck Mileage	pump and mix 390 sks type 2/5 cement
P.U. Mileage	displace .5 bbl thru mixer
Other Charges	rig down from tubing
Total Charges	wash up in cellar good cement to surface
THANK YOU	

safety meeting held

fig up to tubing with hose and valve

Pump 5 bbls to clear tubing

~~pump 3 bbls to clear tubing~~

mixing. Ethylidene polymer

displace .5 bbl thru

rig down from the

wash up in cellar

good cement to soil

THANK YOU

Bryan Hammond Lead Yield 1.38 Lead Wt. 14.6 Lead Water 6.8 SV 95

John Graham T-2 Mail
Toll Wk **Lead Water** **SV**

Helper John Cranford **Print Name** John Cranford **Phone No.** (301) 435-1234 **E-mail Address** john.cranford@nasa.gov

District Gillette State WY

The above job was done under supervision of the owner, operator, or his agent whose signature appears below.

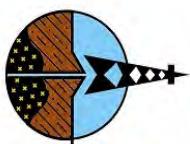
Agent or Contractor of Operator

Sales Ticket for Materials Only

Signature of operator

APPENDIX E

Geophysical Logs



Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	FLORENCE COPPER		
WELL ID	R-07		
FIELD	FLORENCE COPPER		
COUNTY	PINAL		
STATE	ARIZONA		
TYPE OF LOGS: E-LOG MORE: NAT. GAMMA			OTHER SERVICES 3-ARM CALIPER TEMPERATURE FLUID RESISTIVITY SONIC DEVIATION
SEC	TWP	RGE	ELEVATION K.B. D.F. G.L.
PERMANENT DATUM	GROUND LEVEL	ABOVE PERM. DATUM	
LOG MEAS. FROM	DRILLING MEAS. FROM GROUND LEVEL		
DATE	1-1-18	TYPE FLUID IN HOLE	MUD
RUN No	1 & 2	MUD WEIGHT	N/A
TYPE LOG	E-LOG - NAT. GAMMA	VISCOSITY	N/A
DEPTH-DRILLER	1225 FT.	LEVEL	FULL
DEPTH-LOGGER	1225 FT.	MAX. REC. TEMP.	25.28 DEG. C
BTMLLOGGED INTERVAL	1225 FT.	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.2 FT.
DRILLER / RIG#	HYDRO RESOURCES	LOGGING TRUCK	TRUCK #900 / #200
RECORDED BY / Logging Eng.	A. OLSON / E. TURNER	TOOL STRING/SN	MSI E-LOG 40GRP SN 5019
WITNESSED BY	KENDRA - H&A	LOG TIME:ON SITE/OFF SITE	7:00 P.M.
RUN	BOREHOLE RECORD	CASING RECORD	
NO.	BIT	FROM	TO
1	? IN.	SURFACE	40 FT.
2	20 IN.	40 FT.	506 FT.
3	12 1/4 IN.	TOTAL DEPTH	
COMMENTS:			

Date	11-19-17 / 1-1-18	Date	11-19-17 / 1-1-18	Date	11-19-17 / 1-1-18
Run No.	1	Run No.	2	Run No.	3
Tool Model	MSI COMBO TOOL	Tool Model	MSI E-LOG 40GRP	Tool Model	MSI 60MM SONIC
Tool SN	4183 / 5543	Tool SN	4790 / 5019	Tool SN	5050
From	SURFACE	From	SURFACE	From	SURFACE
To	1220 FT.	To	1220 FT.	To	1220 FT.
Recorded By	A. OLSON	Recorded By	A. OLSON	Recorded By	A. OLSON
Truck No	900 / 200	Truck No	900 / 200	Truck No	900 / 200
Operation Check	12-31-17	Operation Check	12-31-17	Operation Check	12-31-17
Calibration Check	12-31-17	Calibration Check	12-31-17	Calibration Check	N/A
Time Logged	7:50 P.M.	Time Logged	8:35 P.M.	Time Logged	9:20 P.M.

Date	11-19-17 / 1-1-18	Date	11-19-17 / 1-1-18	Date	11-19-17 / 1-1-18
Run No.	4	Run No.	5	Run No.	6
Tool Model	MSI DEVIATION	Tool Model	MSI DEVIATION	Tool Model	MSI DEVIATION
Tool SN	3082	Tool SN	3082	Tool SN	3082
From	SURFACE	From	SURFACE	From	SURFACE
To	1220 FT.	To	1220 FT.	To	1220 FT.
Recorded By	A. OLSON	Recorded By	A. OLSON	Recorded By	A. OLSON
Truck No	900 / 200	Truck No	900 / 200	Truck No	900 / 200
Operation Check	12-31-17	Operation Check	12-31-17	Operation Check	12-31-17
Calibration Check	N/A	Calibration Check	N/A	Calibration Check	N/A
Time Logged	9:55 P.M.	Time Logged	9:55 P.M.	Time Logged	9:55 P.M.

Additional Comments:		Calibration Points:		8 IN. & 23 IN.	
Caliper Arms Used:	15 IN.				

E-Log Calibration Range: 1-1000 OHM-M

Calibration Points: 1 & 1000 OHM-M

Disclaimer:

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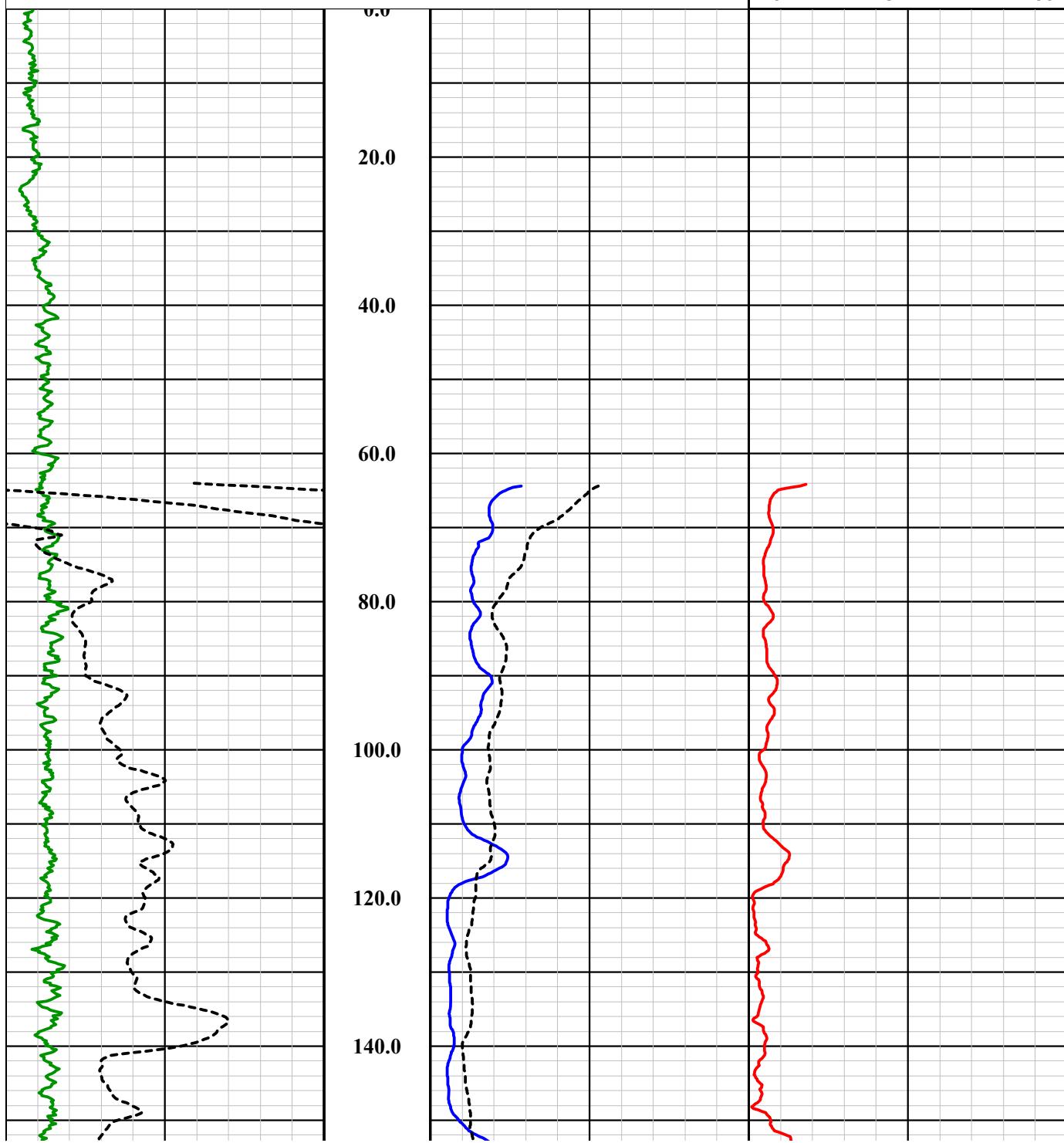
Nat. Gamma			Depth	16" NRes		
0	API	400	1in:20ft	0	Ohm-m	400
SP				64" NRes		

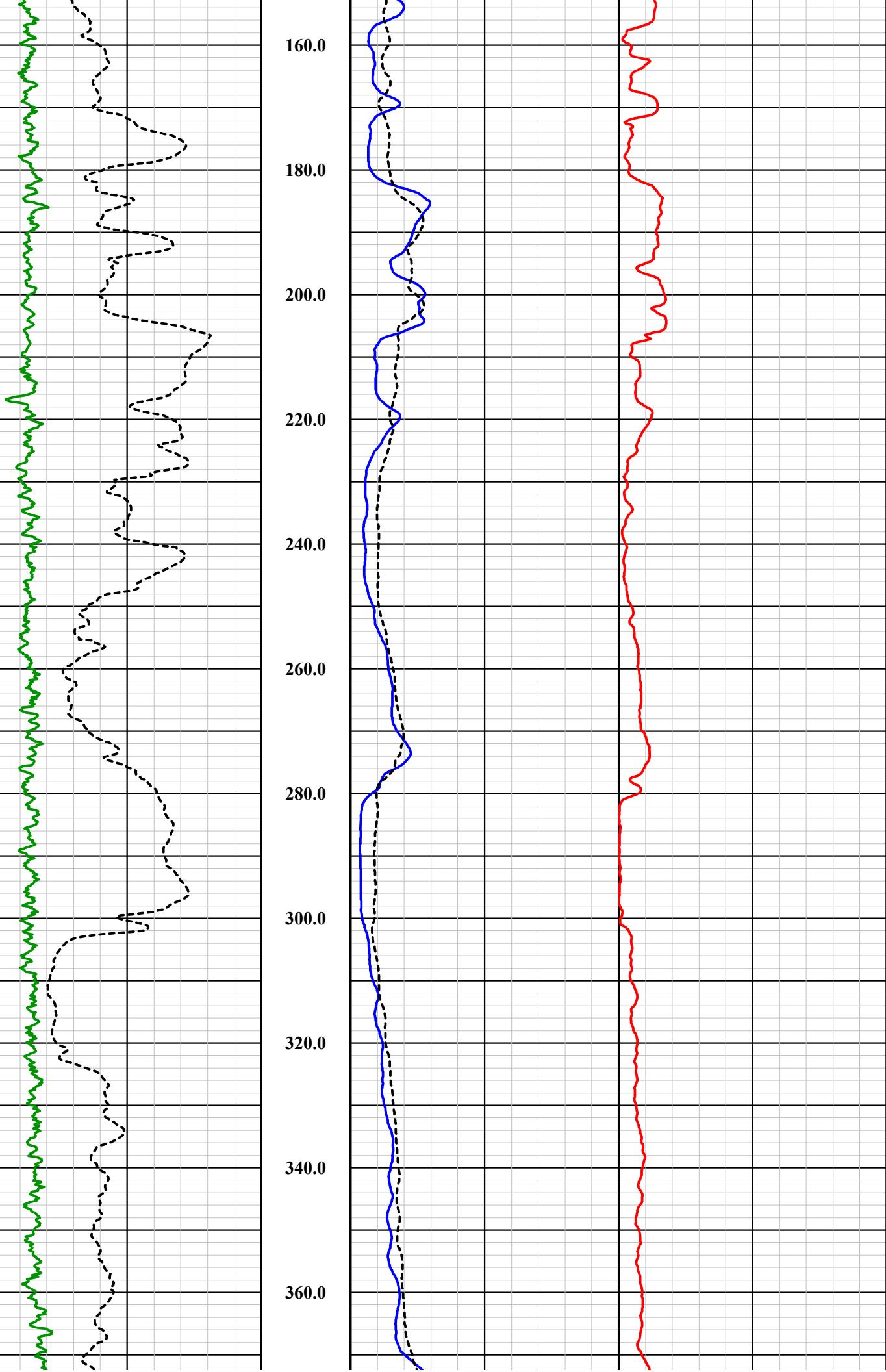
300	mV	600
-----	----	-----

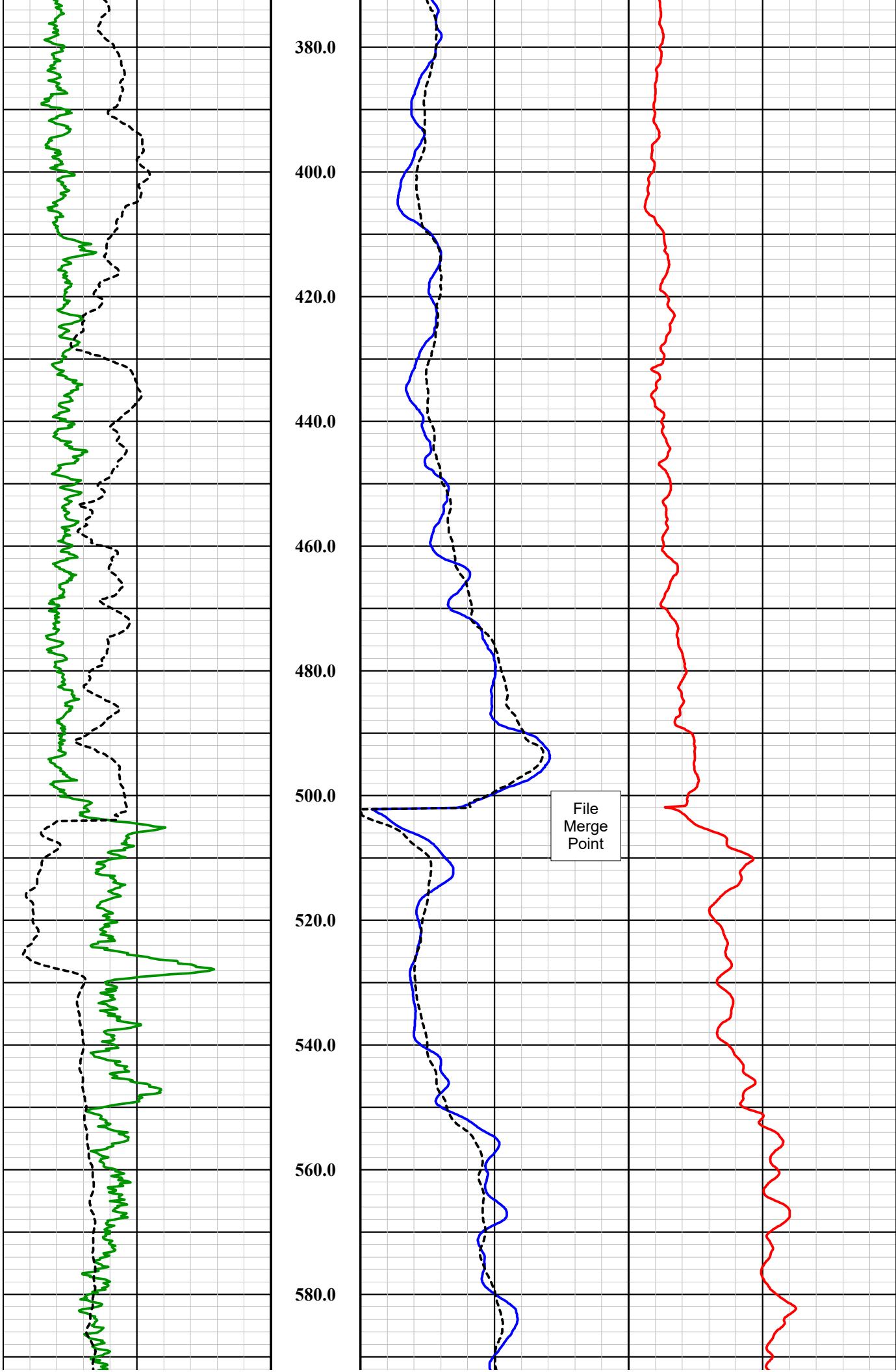
0	Ohm-m	400
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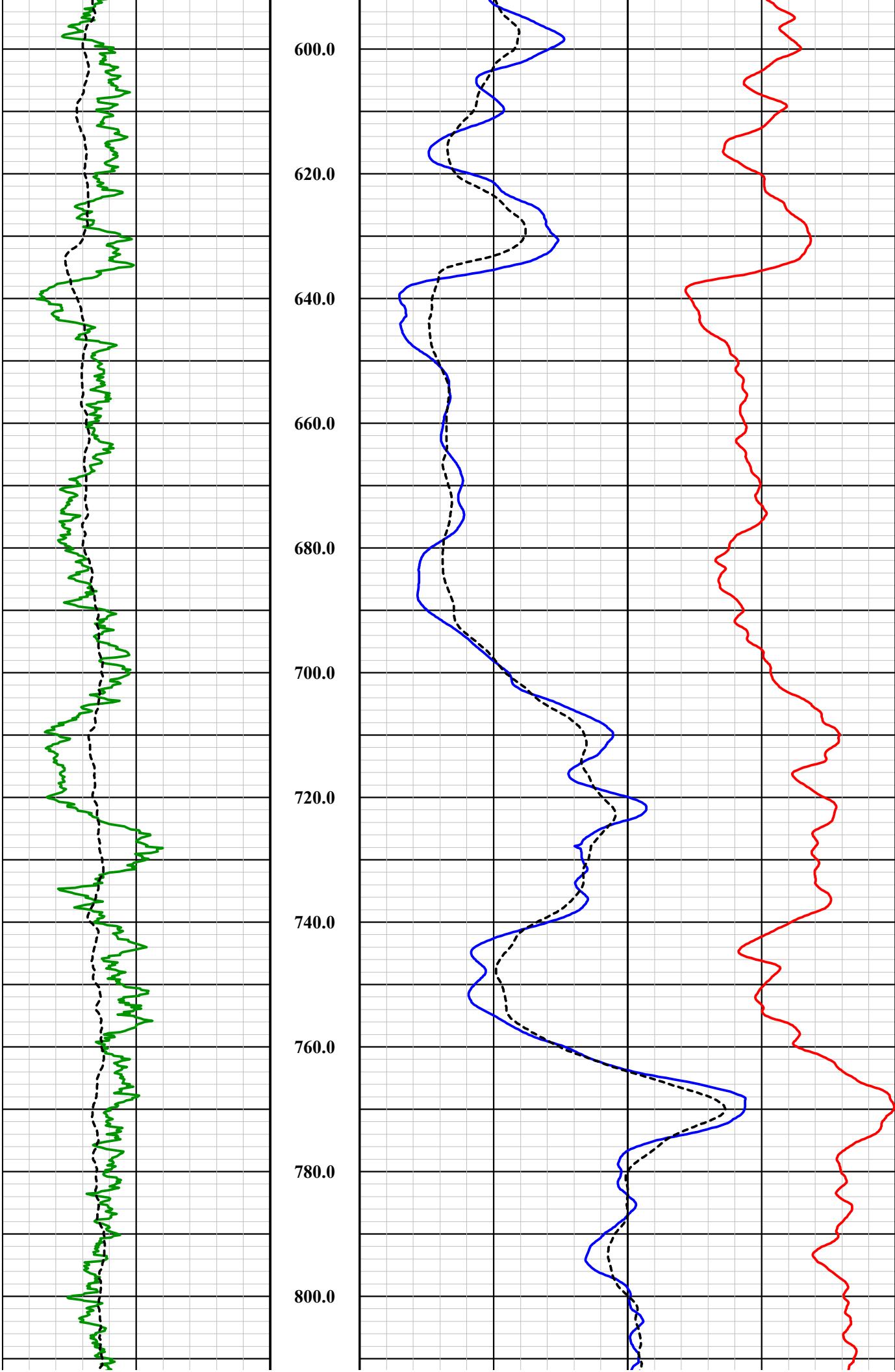
SPR

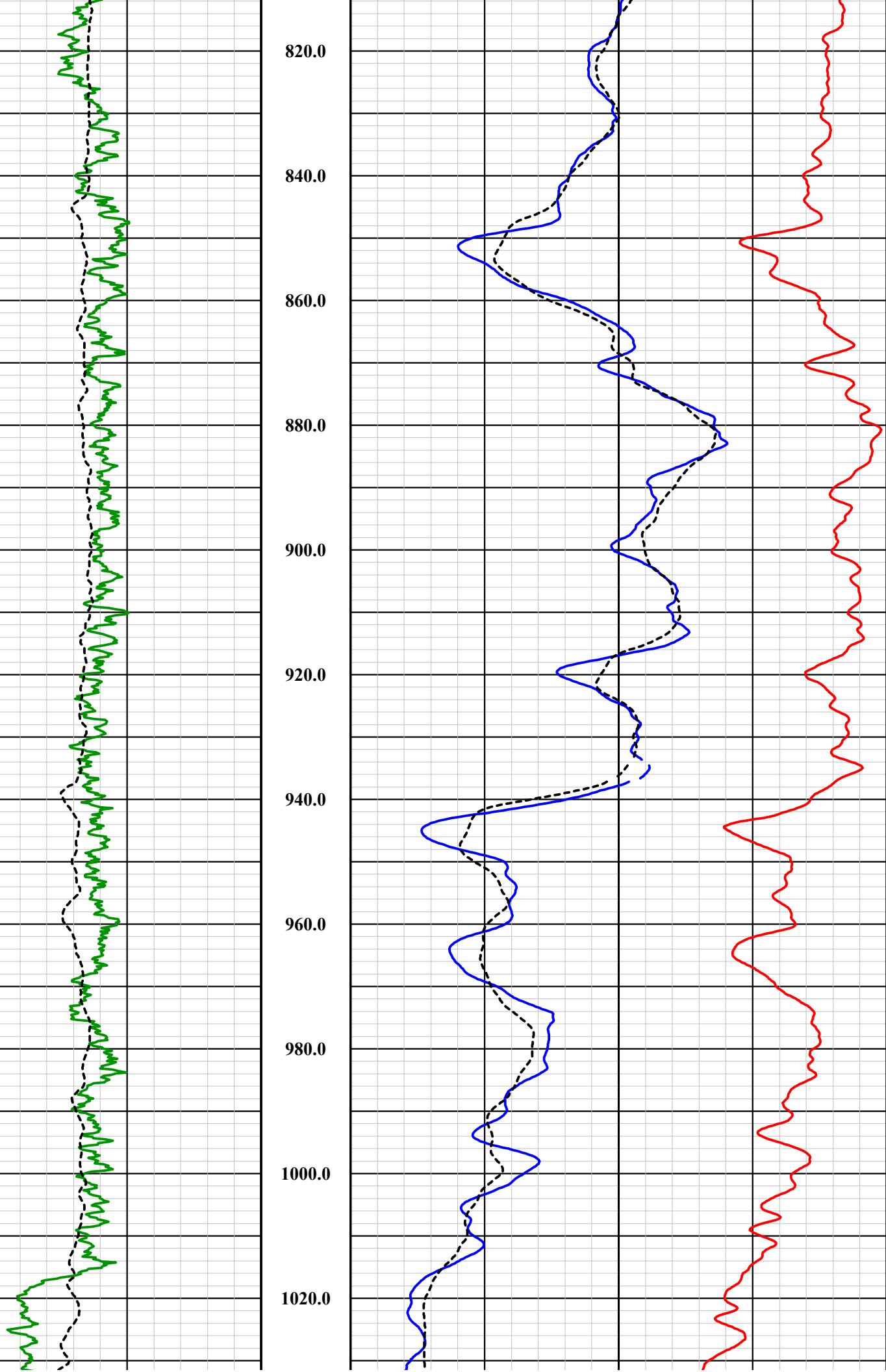
15	Ohms	85
----	------	----

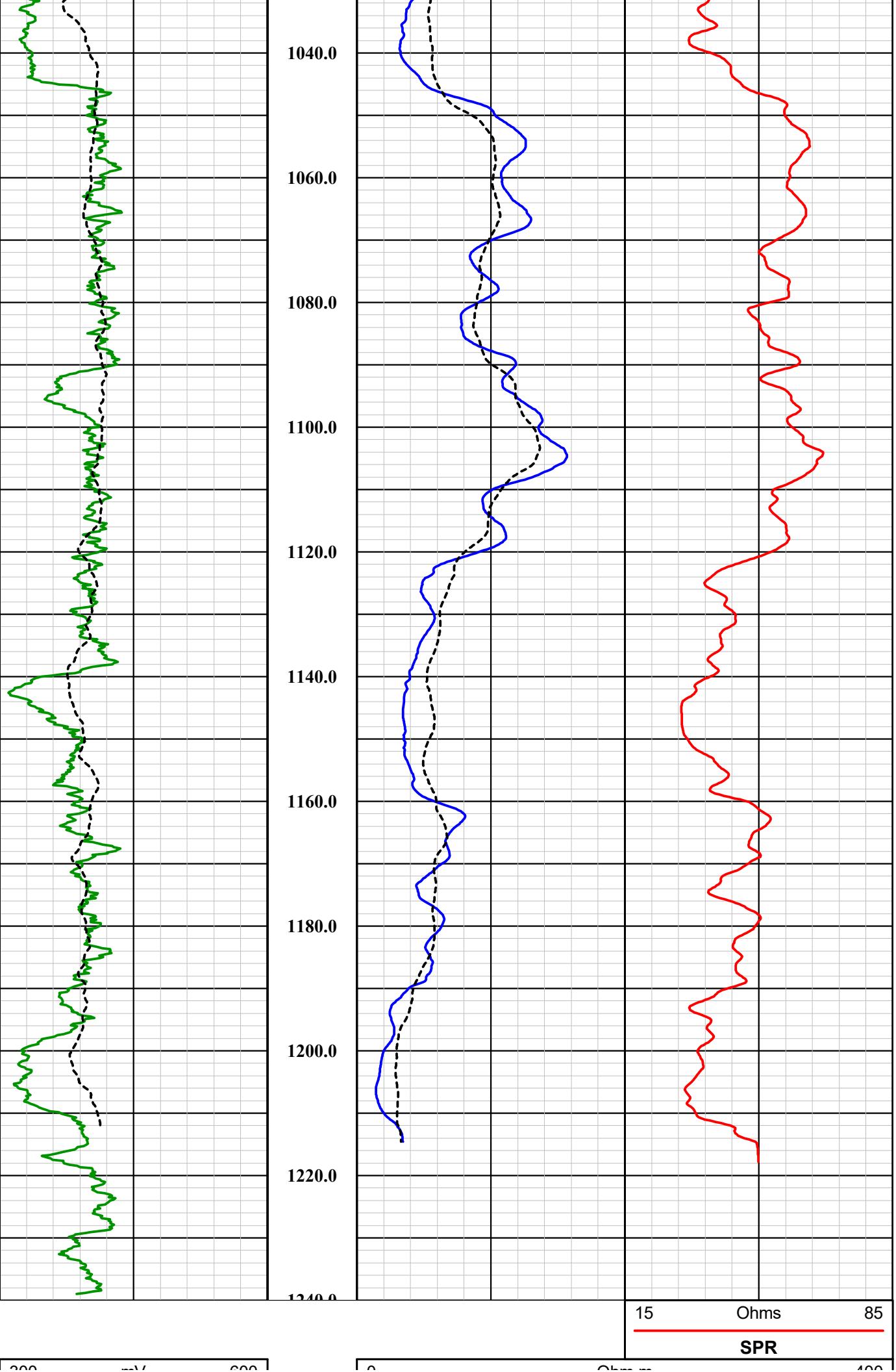












15 Ohms 85

SPR

300	mv	600	0	Ohm-m	400
SP				64" NRes	
0	API	400	0	Ohm-m	400
Nat. Gamma		1in:20ft	Depth	16" NRes	

MSI 40GRP E-Log Tool

Probe Top = Depth Ref.

Tool SN: 5019, 5513, & 5514



Four Conductor MSI Probe Top

Bridle connects to wireline cablehead: Wireline armor is the B Electrode.

Bridle Electrode (N Electrode)

Probe Length = 1.98 m or 6.5 ft

Bridle Length = 7.88 m or 25.86 ft

Probe Weight = 7.3 kg or 16.0 lbs

Can only be collected in fluid

Isolation Bridle

Temperature Rating: 70 Deg C (158 Deg F)

Pressure Rating: 200 bar (2900 psi)

64" Normal Resistivity Electrode/Spontaneous Potential Electrode (M Electrode)

Electrode Measuring Points (from bottom of probe)

Spontaneous Potential (SP): 1.777 m or 5.81 ft

16" Normal Resistivity (16" NRes): 0.3548 m or 1.16 ft

64" Normal Resistivity (64" NRes): 0.9644 m or 3.16 ft

Single Point Resistance (SPR): 0.152 m or 0.50 ft

Natural Gamma Ray (Nat. Gamma): 0.73 m or 2.39 ft

Natural Gamma Ray

16" Normal Resistivity Electrode (M Electrode)



Current Electrode/Single Point Resistance Electrode (A Electrode)

1.63" or 40 mm Diameter (41.4 mm with neoprene heat shrink and electrical tape)

MSI Gamma-Caliper-Temperature-Fluid Resistivity

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft

Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)

Pressure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 0.76 m (29.75 in)

NOTE: Lengths on a particular tool may vary from those listed on this document due to probe sizes and styles utilized

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"



TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter



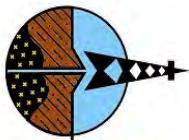
**Southwest Exploration
Services, LLC**

borehole geophysics & video services

Company	FLORENCE COPPER
Well	R-07
Field	FLORENCE COPPER
County	PINAL
State	ARIZONA

Final

E-Log Summary



Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	FLORENCE COPPER		
WELL ID	R-07		
FIELD	FLORENCE COPPER		
COUNTY	PINAL		
STATE	ARIZONA		
TYPE OF LOGS: GAMMA - CALIPER			
MORE: TEMP. / FLUID RES.			
LOCATION	OTHER SERVICES DEVIATION		
SEC	TWP	RGE	ELEVATION
PERMANENT DATUM	GROUND LEVEL	ABOVE PERM. DATUM	K.B. D.F. G.L.
DATE	11-19-17 / 1-1-18	TYPE FLUID IN HOLE	MUD
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	GAMMA - CALIPER - TFR	VISCOSITY	N/A
DEPTH-DRILLER	1244 FT.	LEVEL	FULL
DEPTH-LOGGER	1244 FT.	MAX. REC. TEMP.	26.11 DEG. C
BTMLLOGGED INTERVAL	1244 FT.	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.2 FT.
DRILLER / RIG#	HYDRO RESOURCES	LOGGING TRUCK	TRUCK #900 / #200
RECORDED BY / Logging Eng.	A. OLSON / E. TURNER	TOOL STRING/SN	MSI COMBO TOOL SN 5543
WITNESSED BY	COLLIN / SCOTT - H&A	LOG TIME:ON SITE/OFF SITE	5:00 P.M.

Tool Summary:					
Date	11-19-17 / 1-1-18	Date	11-19-17 / 1-1-18	Date	11-19-17 / 1-1-18
Run No.	1	Run No.	2	Run No.	3
Tool Model	MSI COMBO TOOL	Tool Model	MSI E-LOG 40GRP	Tool Model	MSI 60MM SONIC
Tool SN	4183 / 5543	Tool SN	4790 / 5019	Tool SN	5050
From	SURFACE	From	SURFACE	From	SURFACE
To	1220 FT.	To	1220 FT.	To	1220 FT.
Recorded By	A. OLSON	Recorded By	A. OLSON	Recorded By	A. OLSON
Truck No	900 / 200	Truck No	900 / 200	Truck No	900 / 200
Operation Check	12-31-17	Operation Check	12-31-17	Operation Check	12-31-17
Calibration Check	12-31-17	Calibration Check	12-31-17	Calibration Check	N/A
Time Logged	7:50 P.M.	Time Logged	8:35 P.M.	Time Logged	9:20 P.M.

Date	11-19-17 / 1-1-18	Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model	MSI DEVIATION	Tool Model		Tool Model	
Tool SN	3082	Tool SN		Tool SN	
From	SURFACE	From		From	
To	1220 FT.	To		To	
Recorded By	A. OLSON	Recorded By		Recorded By	
Truck No	900 / 200	Truck No		Truck No	
Operation Check	12-31-17	Operation Check		Operation Check	
Calibration Check	N/A	Calibration Check		Calibration Check	
Time Logged	9:55 P.M.	Time Logged		Time Logged	

Additional Comments:

Caliper Arms Used: 15 IN.

Calibration Points: 8 IN. & 23 IN.

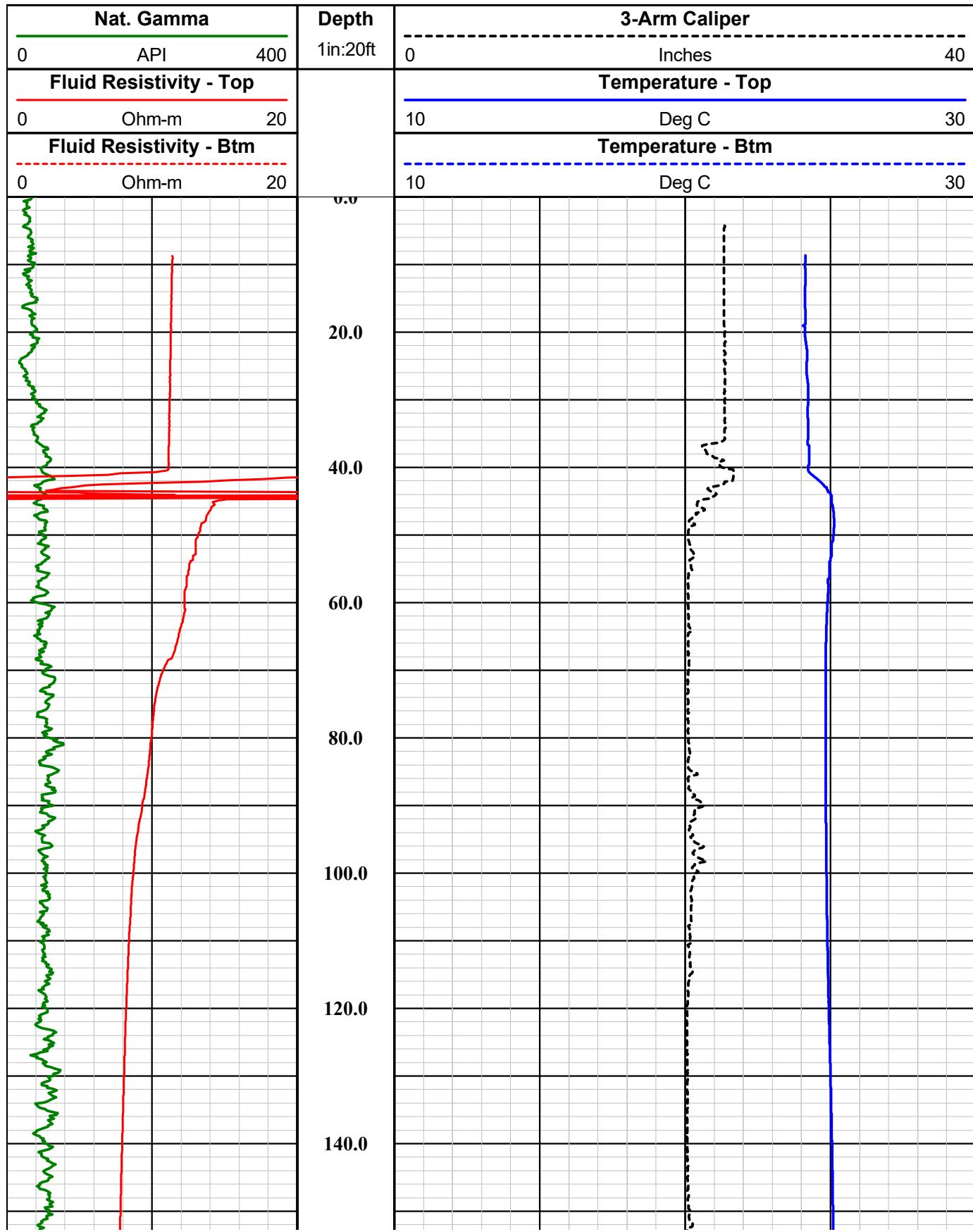
COMMENTS:

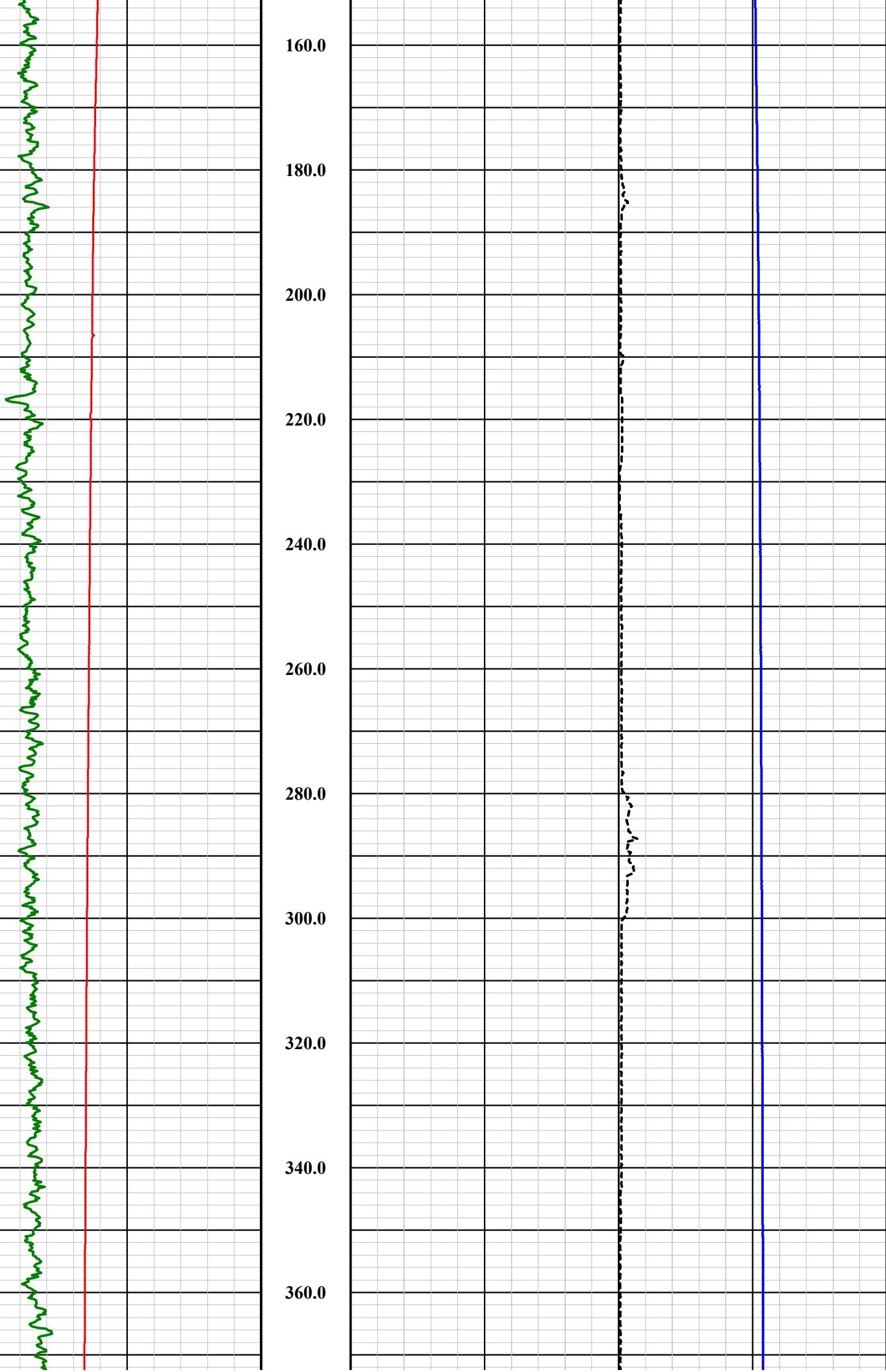
E-Log Calibration Range: 1-1000 OHM-M

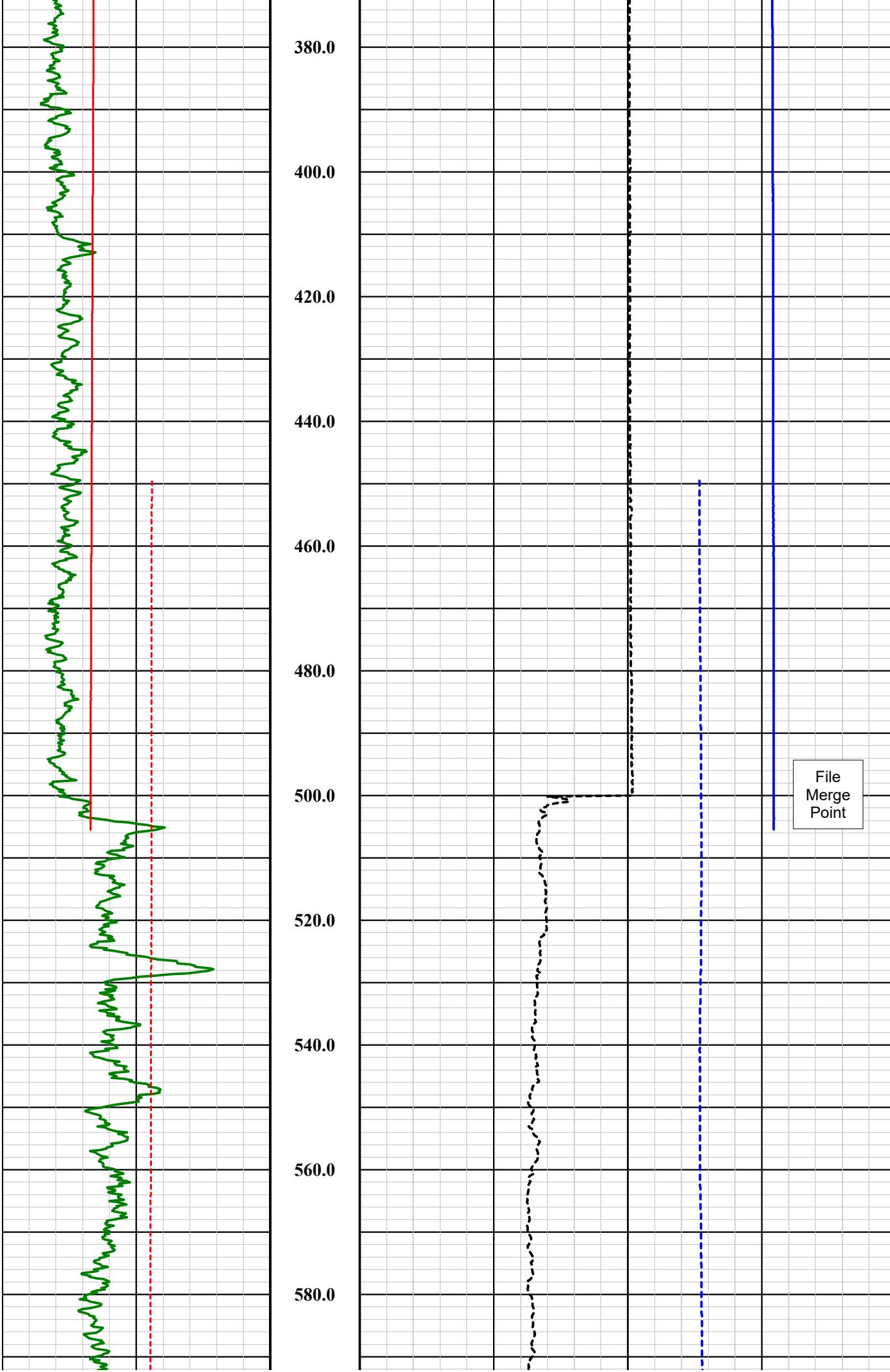
Calibration Points: 1 & 1000 OHM-M

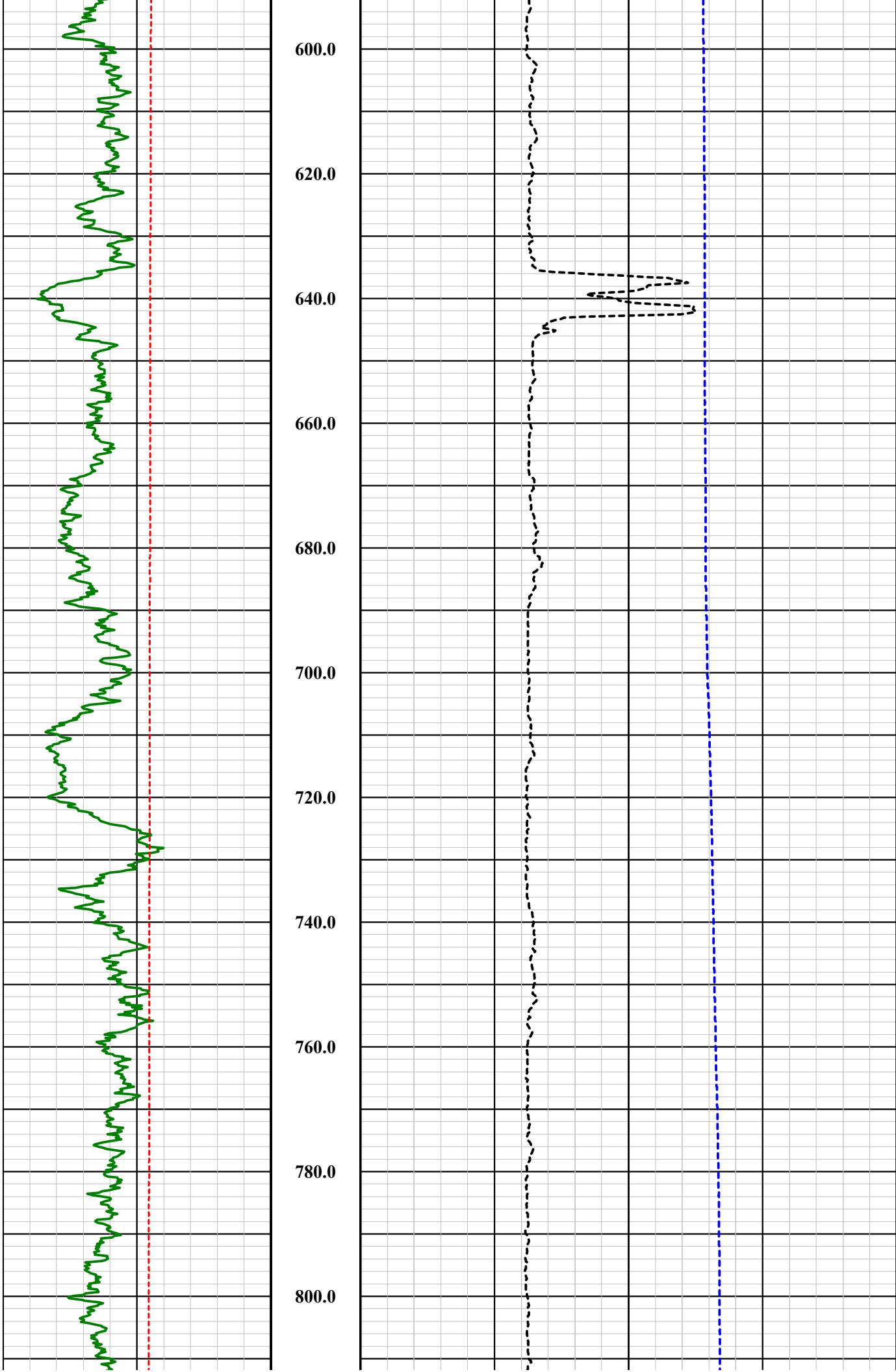
Disclaimer:

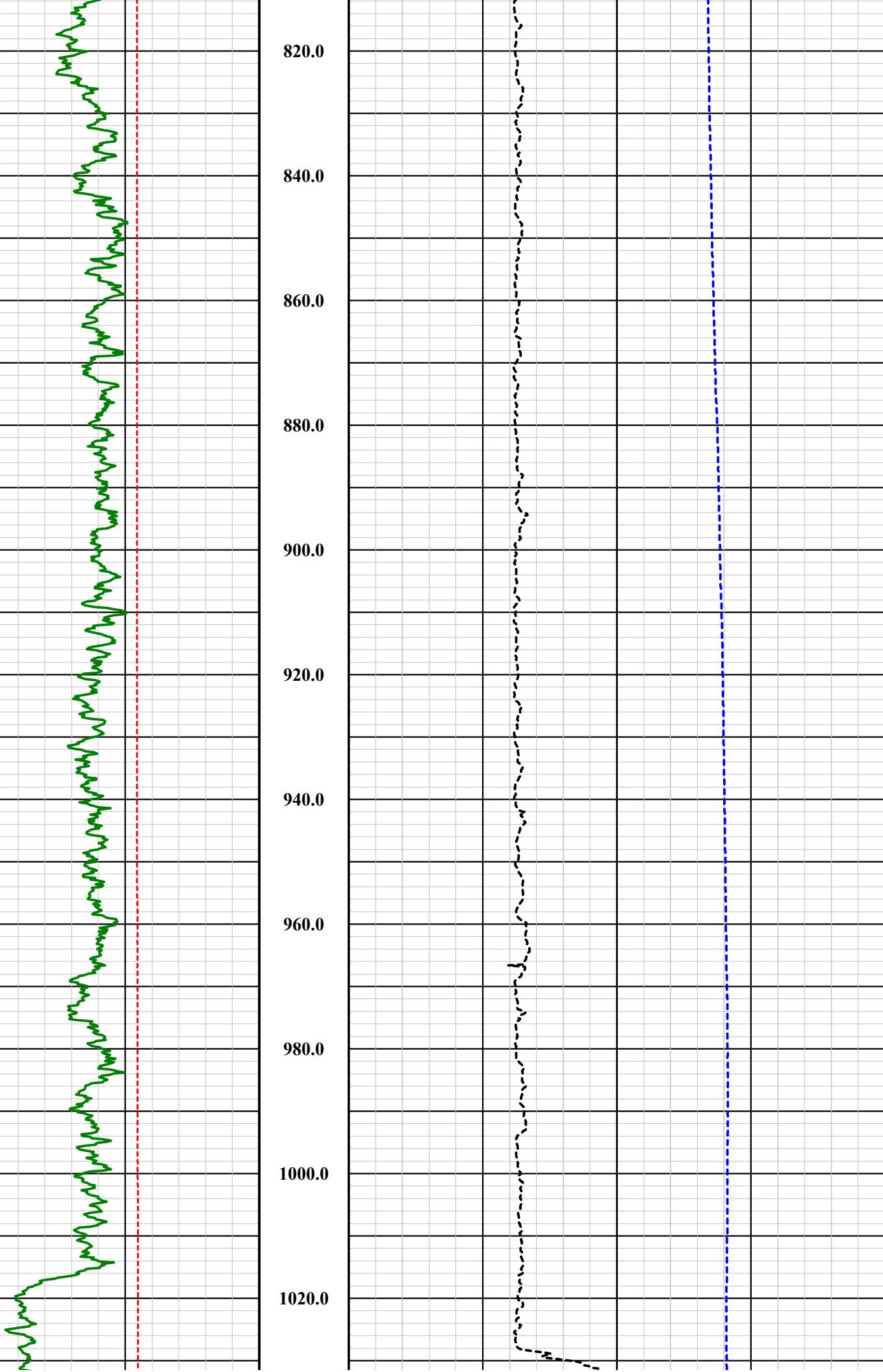
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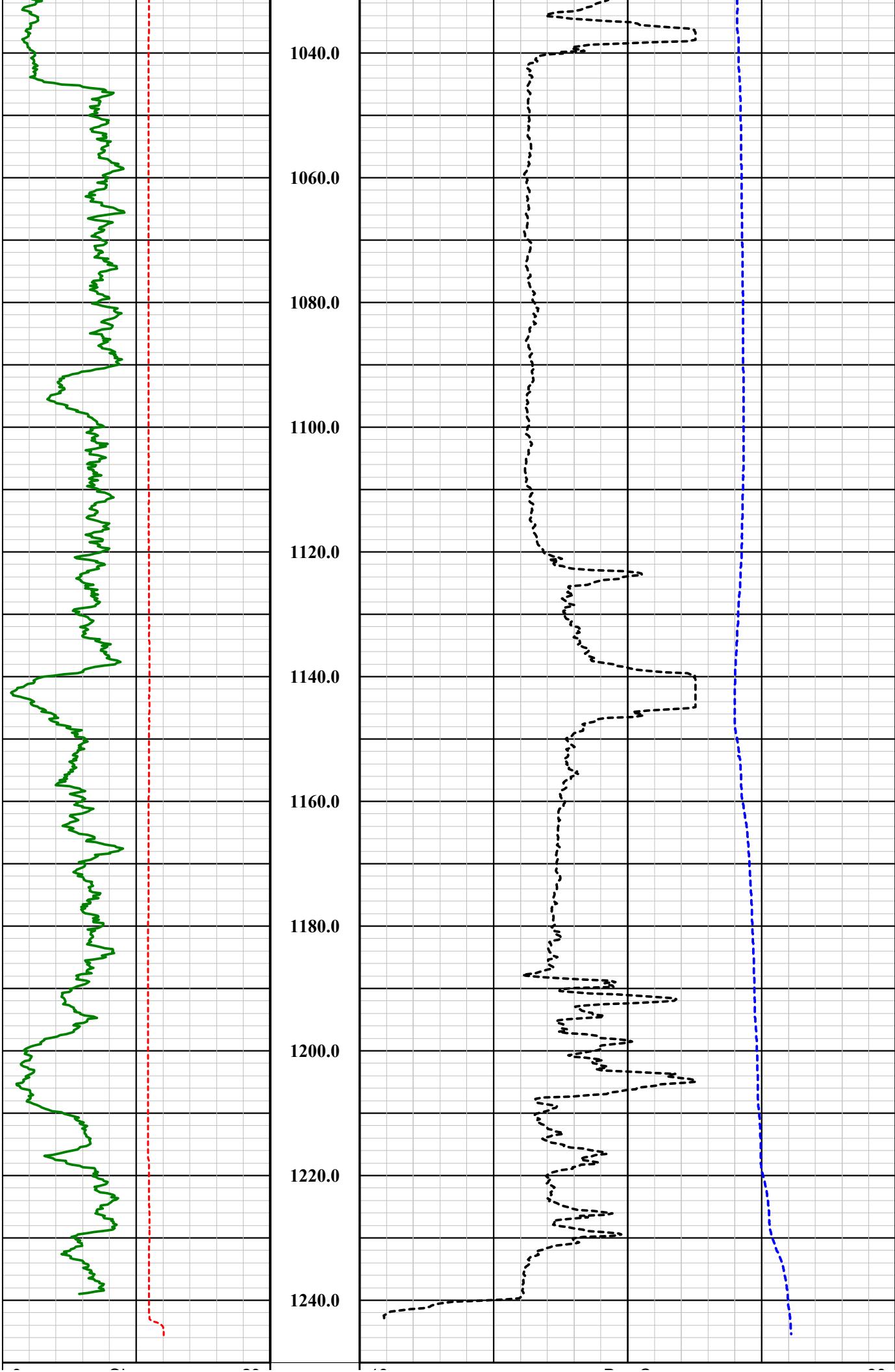








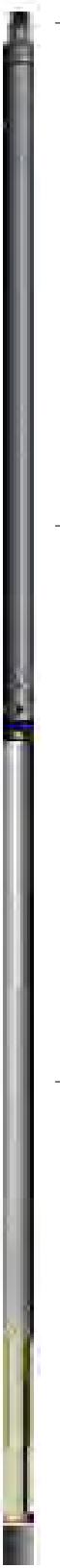




0	Ohm-m	20		10	Deg C	30
Fluid Resistivity - Btm						
0	Ohm-m	20		10	Deg C	30
Fluid Resistivity - Top						
0	API	400	1in:20ft	0	Inches	40
Nat. Gamma						
Depth						3-Arm Caliper

MSI Gamma-Caliper-Temperature-Fluid Resistivity

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft

Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)

Pressure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 0.76 m (29.75 in)

NOTE: Lengths on a particular tool may vary from those listed on this document due to probe sizes and styles utilized

3-Arm Caliper = 1.44 m (56.75 in)

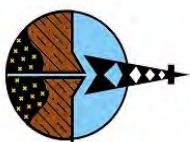
Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter

 <p>Southwest Exploration Services, LLC borehole geophysics & video services</p>	Company	FLORENCE COPPER
	Well	R-07
	Field	FLORENCE COPPER
	County	PINAL
	State	ARIZONA
Final	GCT Summary	



Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	FLORENCE COPPER		
WELL ID	R-07		
FIELD	FLORENCE COPPER		
COUNTY	PINAL		
TYPE OF LOGS:	60mm SONIC		
MORE:	GAMMA - CALIPER		
LOCATION			
PERMANENT DATUM	ELEVATION	R.G.E.	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.
DATE	11-19-17 / 1-1-18	TYPE FLUID IN HOLE	MUD
RUN No	1 & 3	MUD WEIGHT	N/A
TYPE LOG	SONIC - GAMMA - CALIPER	VISCOSITY	N/A
DEPTH-DRILLER	1225 FT.	LEVEL	FULL
DEPTH-LOGGER	1225 FT.	MAX. REC. TEMP.	25.28 DEG. C
BTM LOGGED INTERVAL	1225 FT.	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.25 FT.
DRILLER / RIG#	HYDRO RESOURCES	LOGGING TRUCK	TRUCK #900 / #200
RECORDED BY / Logging Eng.	A. OLSON / E. TURNER	TOOL STRING/SN	MSI 60mm SONIC SN 5050
WITNESSED BY	KENDRA - H&A	LOG TIME:ON SITE/OFF SITE	7:00 P.M.
RUN	BOREHOLE RECORD	CASING RECORD	
NO.	BIT	FROM	TO
1	? IN.	SURFACE	40 FT.
2	20 IN.	40 FT.	506 FT.
3	12 1/4 IN.	TOTAL DEPTH	
COMMENTS:			

Date	11-19-17 / 1-1-18	Date	11-19-17 / 1-1-18	Date	11-19-17 / 1-1-18
Run No.	1	Run No.	2	Run No.	3
Tool Model	MSI COMBO TOOL	Tool Model	MSI E-LOG 40GRP	Tool Model	MSI 60MM SONIC
Tool SN	4183 / 5543	Tool SN	4790 / 5019	Tool SN	5050
From	SURFACE	From	SURFACE	From	SURFACE
To	1220 FT.	To	1220 FT.	To	1220 FT.
Recorded By	A. OLSON	Recorded By	A. OLSON	Recorded By	A. OLSON
Truck No	900 / 200	Truck No	900 / 200	Truck No	900 / 200
Operation Check	12-31-17	Operation Check	12-31-17	Operation Check	12-31-17
Calibration Check	12-31-17	Calibration Check	12-31-17	Calibration Check	N/A
Time Logged	7:50 P.M.	Time Logged	8:35 P.M.	Time Logged	9:20 P.M.

Date	11-19-17 / 1-1-18	Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model	MSI DEVIATION	Tool Model		Tool Model	
Tool SN	3082	Tool SN		Tool SN	
From	SURFACE	From		From	
To	1220 FT.	To		To	
Recorded By	A. OLSON	Recorded By		Recorded By	
Truck No	900 / 200	Truck No		Truck No	
Operation Check	12-31-17	Operation Check		Operation Check	
Calibration Check	N/A	Calibration Check		Calibration Check	
Time Logged	9:55 P.M.	Time Logged		Time Logged	

Additional Comments:

Caliper Arms Used: 15 IN.

Calibration Points: 8 IN. & 23 IN.

E-Log Calibration Range: 1-1000 OHM-M

Calibration Points: 1 & 1000 OHM-M

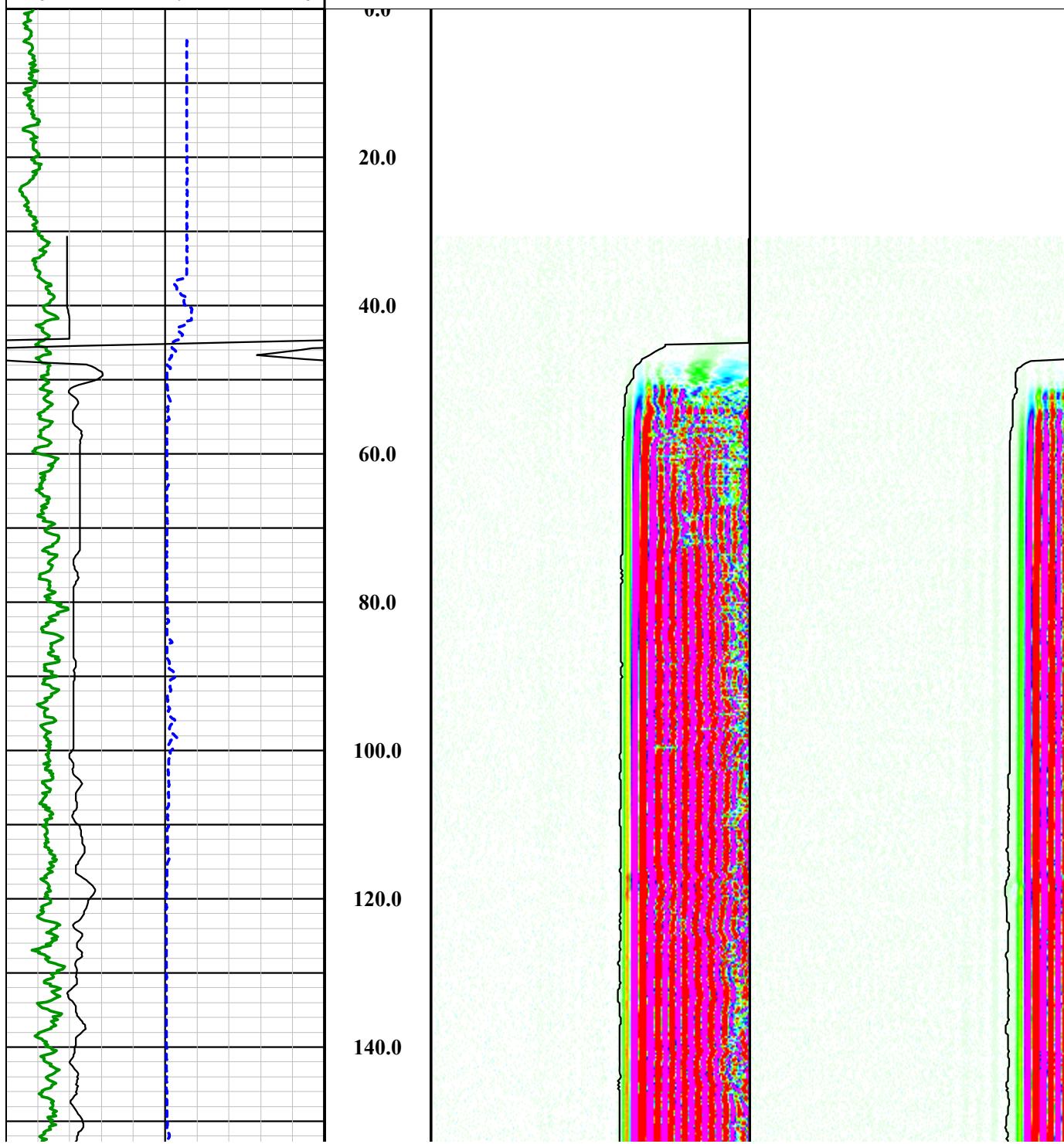
Disclaimer:

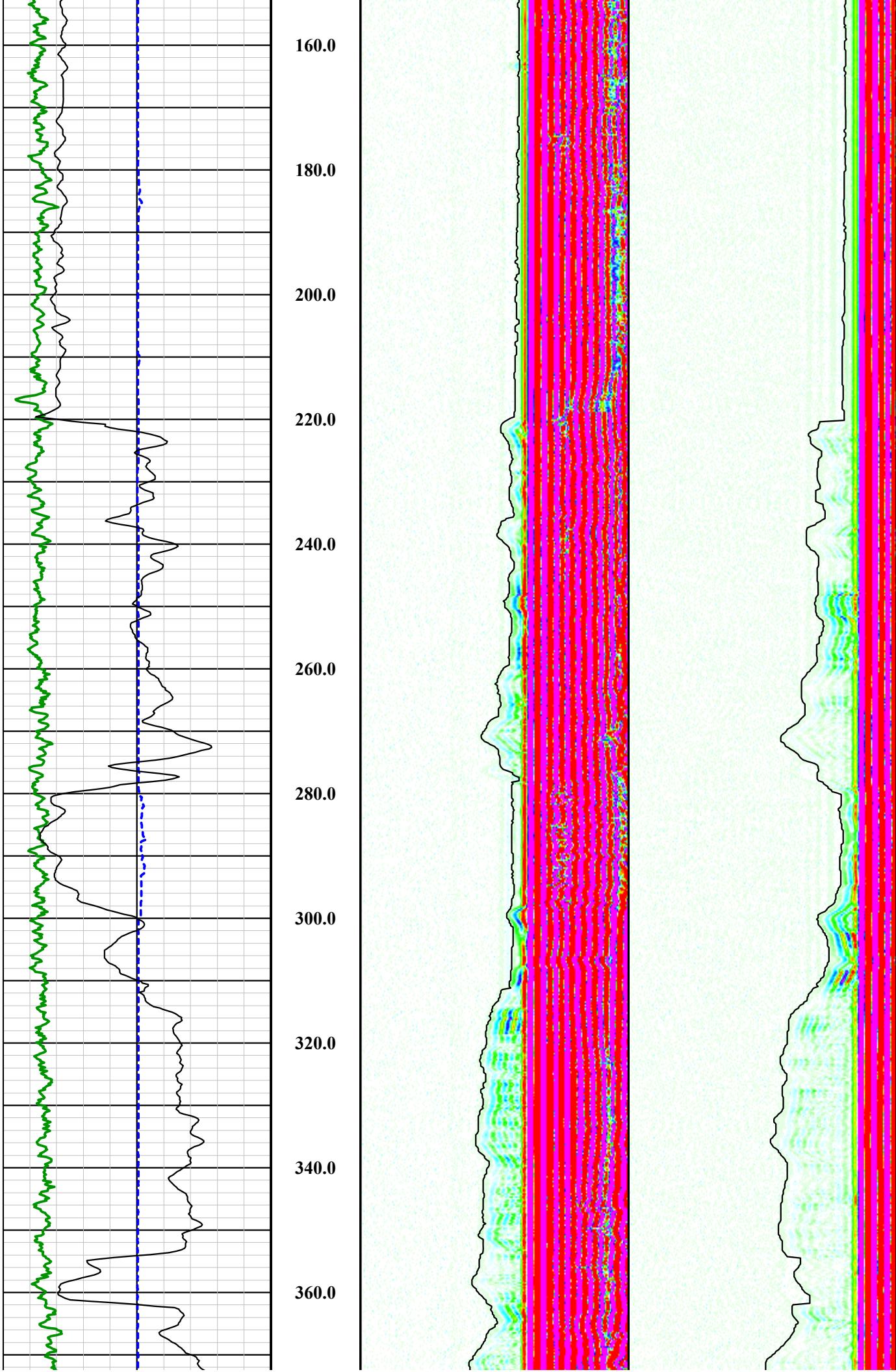
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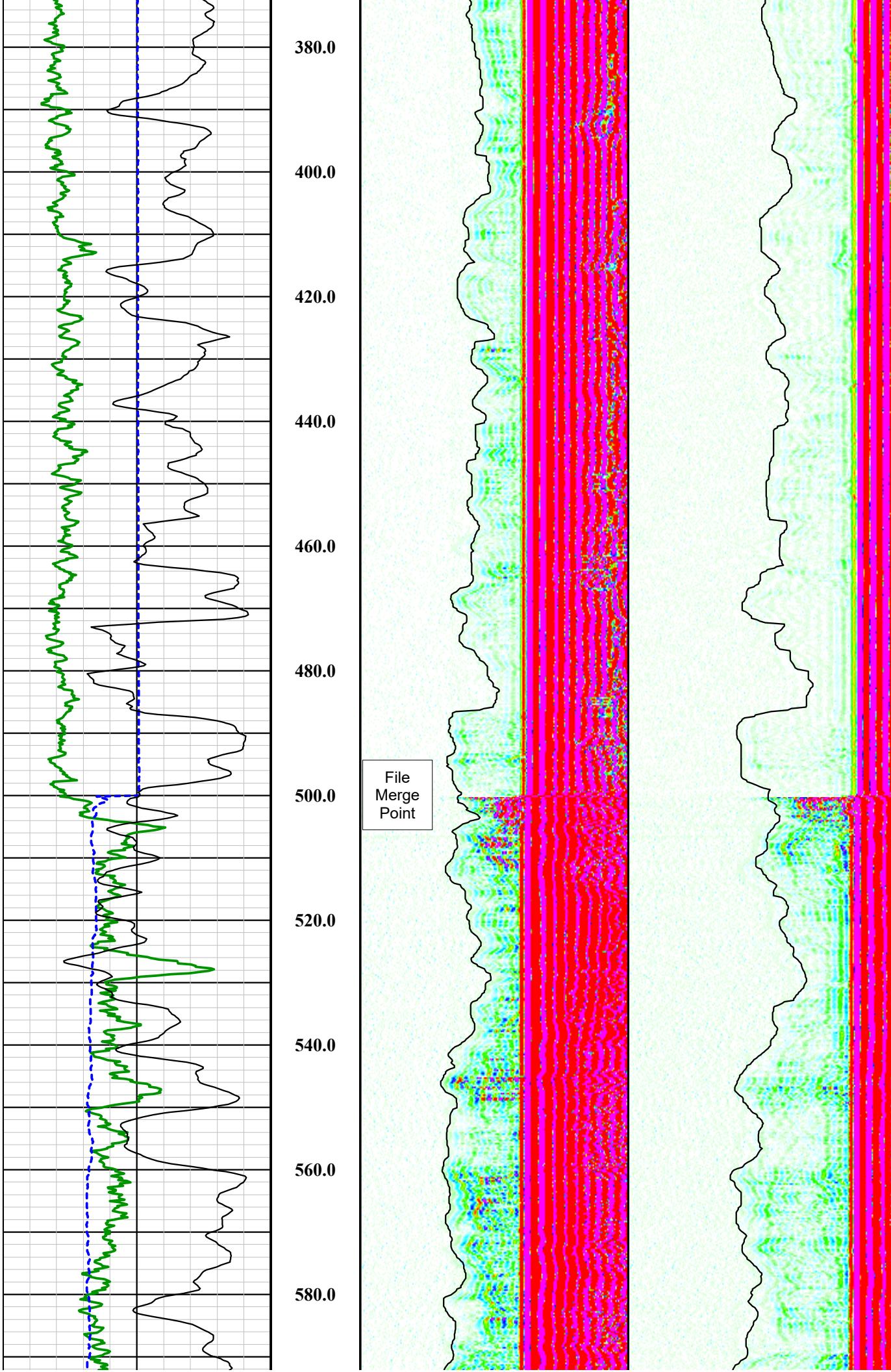
Nat. Gamma	Depth	RX1 - VDL	RX2 - VDL
0 API 400	1in:20ft	100 uSec 1000	100 uSec 1000

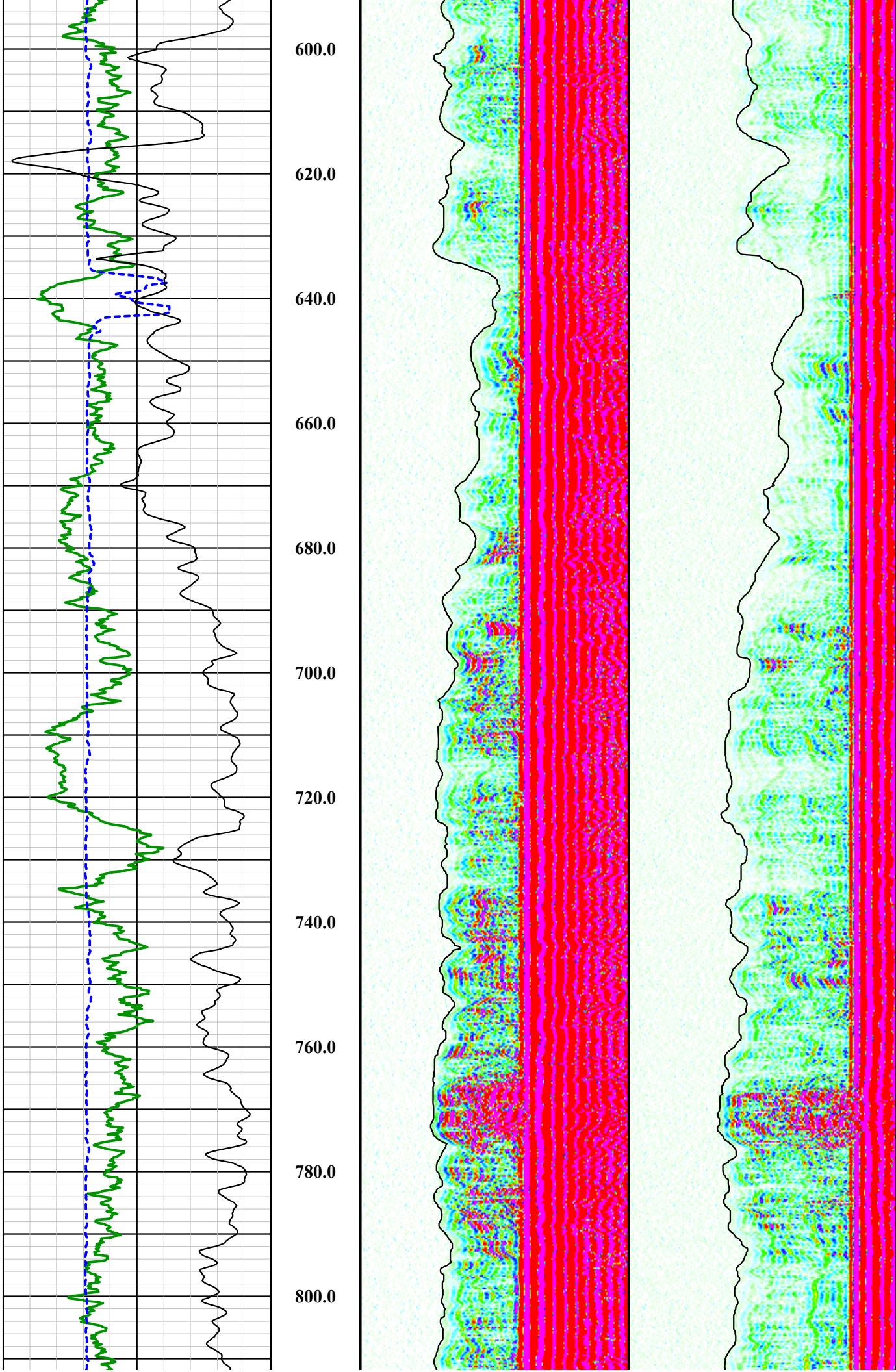
3-Arm Caliper		RX1 - Travel Time	RX2 - Travel Time
0 Inches 40		100 uSec 1000	100 uSec 1000

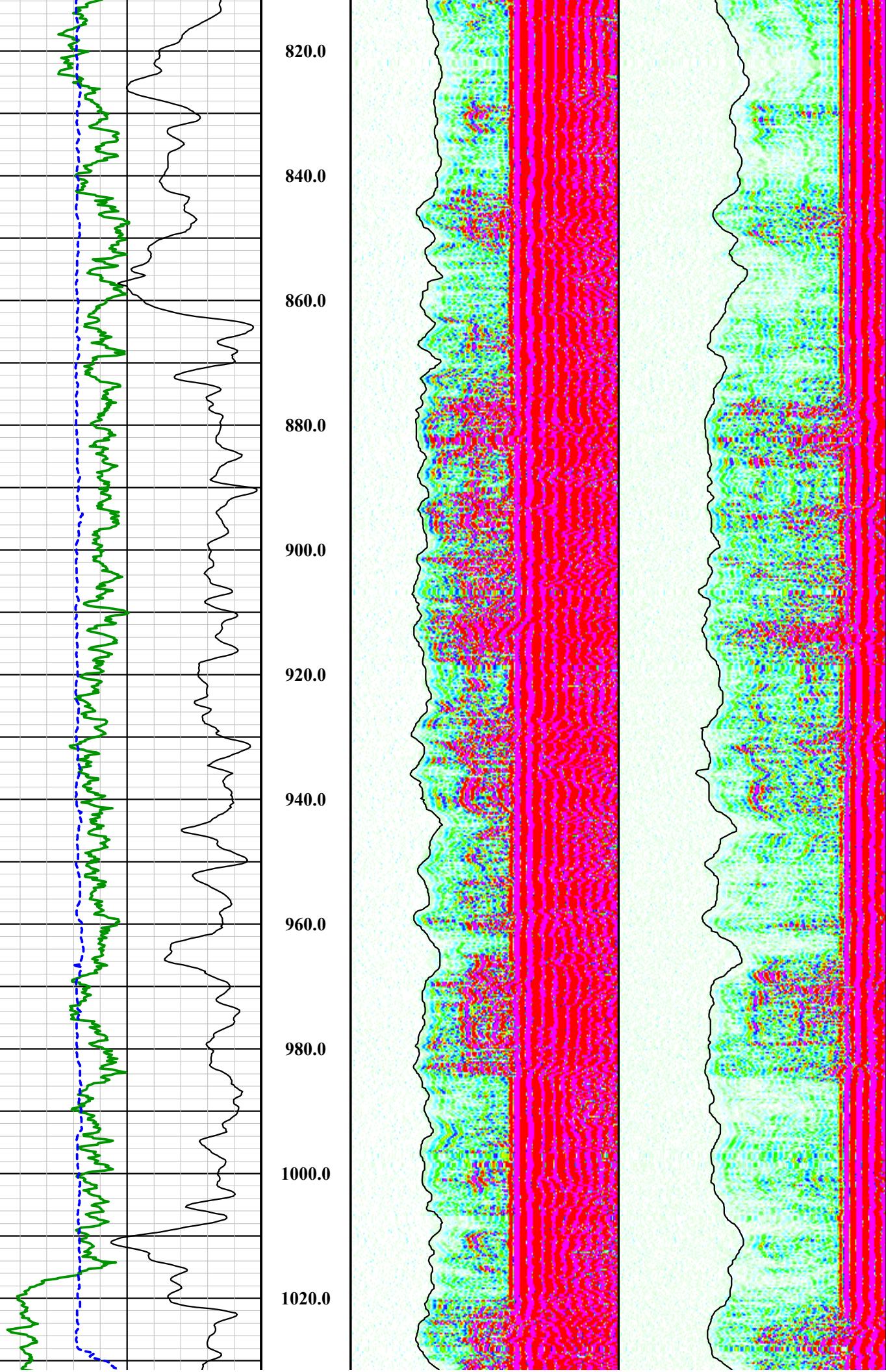
Delta T			
240 uSec/ft 40			

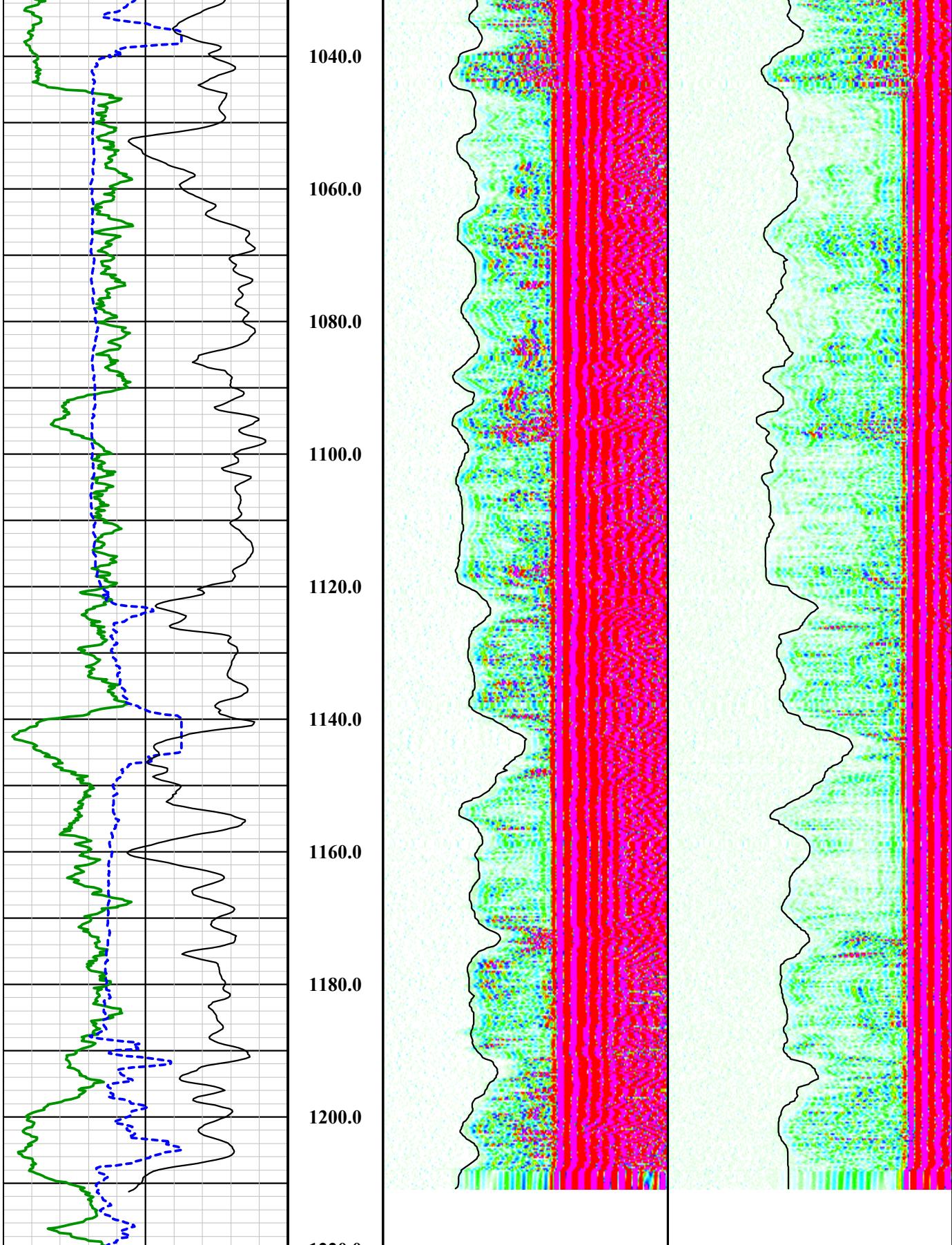












240 uSec/ft 40

Delta T

0 Inches 40

3-Arm Caliper

0 API 400

Nat. Gamma

1040.0

1060.0

1080.0

1100.0

1120.0

1140.0

1160.0

1180.0

1200.0

1220.0

100 uSec 1000

RX1 - Travel Time

100 uSec 1000

RX2 - Travel Time

1in:20ft

100 uSec 1000

RX1 - VDL

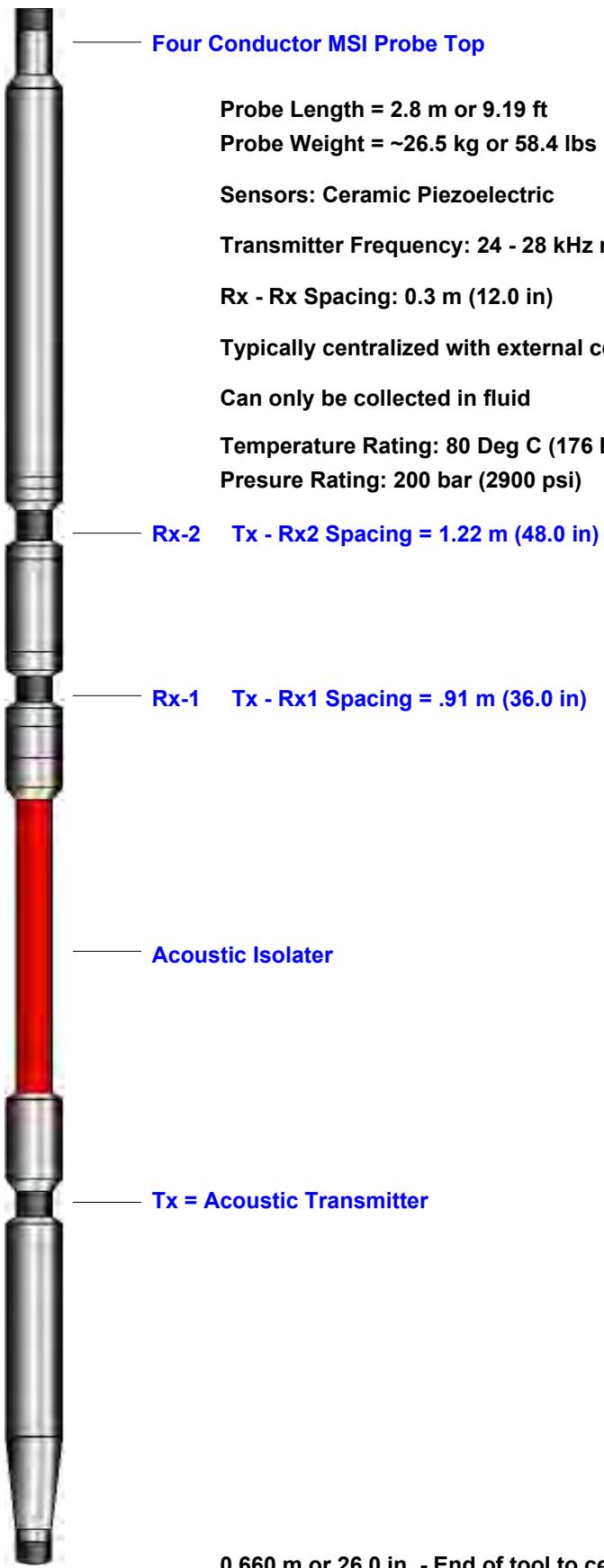
100 uSec 1000

RX2 - VDL

MSI 60 mm 2 RX Full Waveform Sonic Tool

Probe Top = Depth Ref.

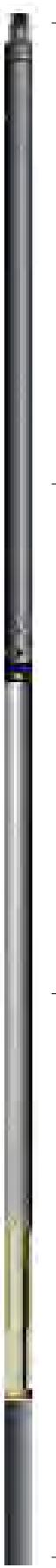
Tool SN: 5001, 5050 & 6003



0.660 m or 26.0 in. - End of tool to center of Tx

MSI Gamma-Caliper-Temperature-Fluid Resistivity

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft

Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)

Pressure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 0.76 m (29.75 in)

NOTE: Lengths on a particular tool may vary from those listed on this document due to probe sizes and styles utilized

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter



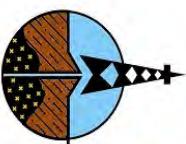
**Southwest Exploration
Services, LLC**

borehole geophysics & video services

Company	FLORENCE COPPER
Well	R-07
Field	FLORENCE COPPER
County	PINAL
State	ARIZONA

Final

Sonic Summary



Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	FLORENCE COPPER		
WELL ID	R-07		
FIELD	FLORENCE COPPER		
COUNTY	PINAL		
STATE	ARIZONA		
TYPE OF LOGS: 3-ARM CALIPER MORE: W/ VOLUME CALC.			OTHER SERVICES E-LOG SONIC DEVIATION
SEC	TWP	RGE	ELEVATION K.B. D.F. G.L.
PERMANENT DATUM LOG MEAS. FROM DRILLING MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	
DATE RUN No.	11-19-17 1	TYPE FLUID IN HOLE MUD WEIGHT	MUD N/A
TYPE LOG DEPTH-DRILLER	VOLUME CALCULATION 506 FT	VISCOSITY LEVEL	N/A FULL
DEPTH-LOGGER	503 FT	MAX. REC. TEMP.	25.58 DEG. C
BTM LOGGED INTERVAL	503 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.2 FT.
DRILLER / RIG#	HYDRO RESOURCES	LOGGING TRUCK	TRUCK #900
RECORDED BY / Logging Eng.	A. OLSON / M. QUINONES	TOOL STRING/SN	MSI COMBO TOOL SN 4183
WITNESSED BY	SCOTT - H&A	LOG TIME:ON SITE/OFF SITE	11:45 P.M.
RUN	BOREHOLE RECORD	CASING RECORD	
NO.	BIT 2"	FROM SURFACE 40 FT	TO 24" STEEL SURFACE 40 FT
1			
2	20"	TOTAL DEPTH	
3			
COMMENTS:			

Tool Summary:					
Date	11-19-17	Date	11-19-17	Date	11-19-17
Run No.	1	Run No.	2	Run No.	3
Tool Model	MSI COMBO TOOL	Tool Model	GEOVISTA E-LOG	Tool Model	MSI 60MM SONIC
Tool SN	4183	Tool SN	4790	Tool SN	5050
From	SURFACE	From	SURFACE	From	SURFACE
To	505 FT	To	505 FT	To	505 FT
Recorded By	M. QUINONES	Recorded By	M. QUINONES	Recorded By	M. QUINONES
Truck No	900	Truck No	900	Truck No	900
Operation Check	11-19-17	Operation Check	11-19-17	Operation Check	11-19-17
Calibration Check	11-19-17	Calibration Check	11-19-17	Calibration Check	N/A
Time Logged	12:00 PM	Time Logged	12:25 P.M.	Time Logged	12:45 P.M.

Date	11-19-17	Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model	MSI DEVIATION	Tool Model		Tool Model	
Tool SN	6002	Tool SN		Tool SN	
From	SURFACE	From		From	
To	505 FT	To		To	
Recorded By	M. QUINONES	Recorded By		Recorded By	
Truck No	900	Truck No		Truck No	
Operation Check	11-19-17	Operation Check		Operation Check	
Calibration Check	N/A	Calibration Check		Calibration Check	
Time Logged	1:15 P.M.	Time Logged		Time Logged	

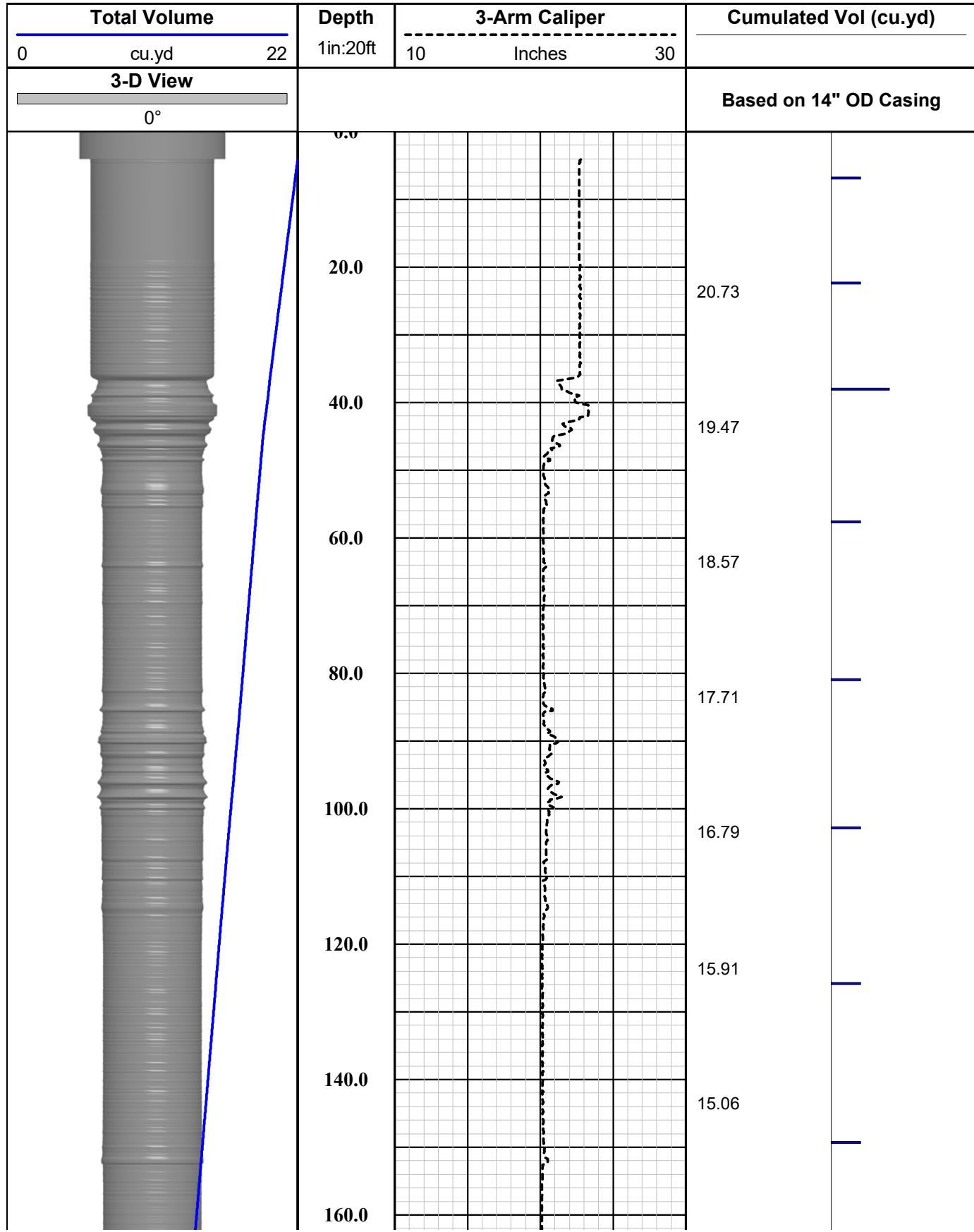
Additional Comments:

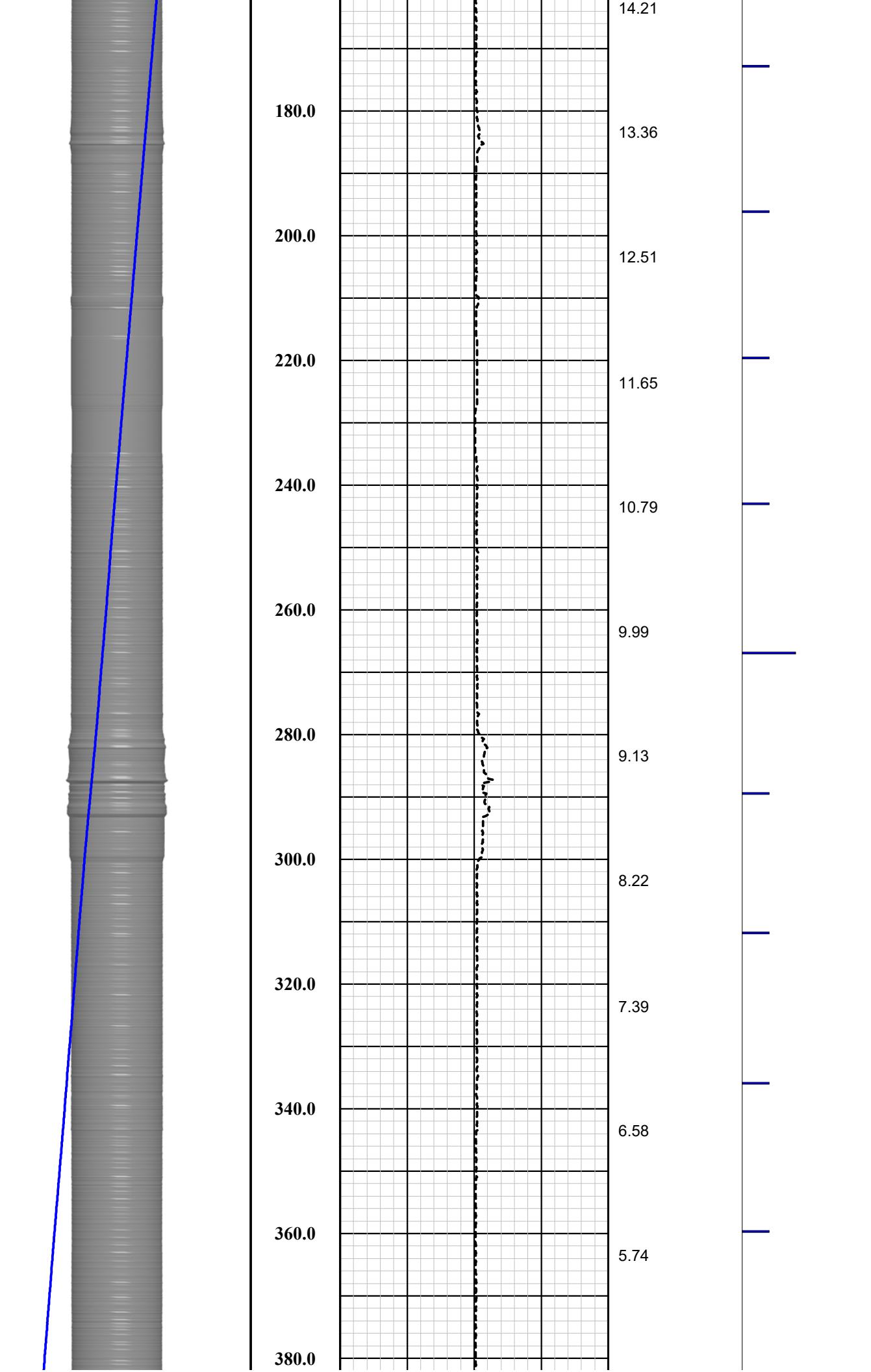
Caliper Arms Used: 16"

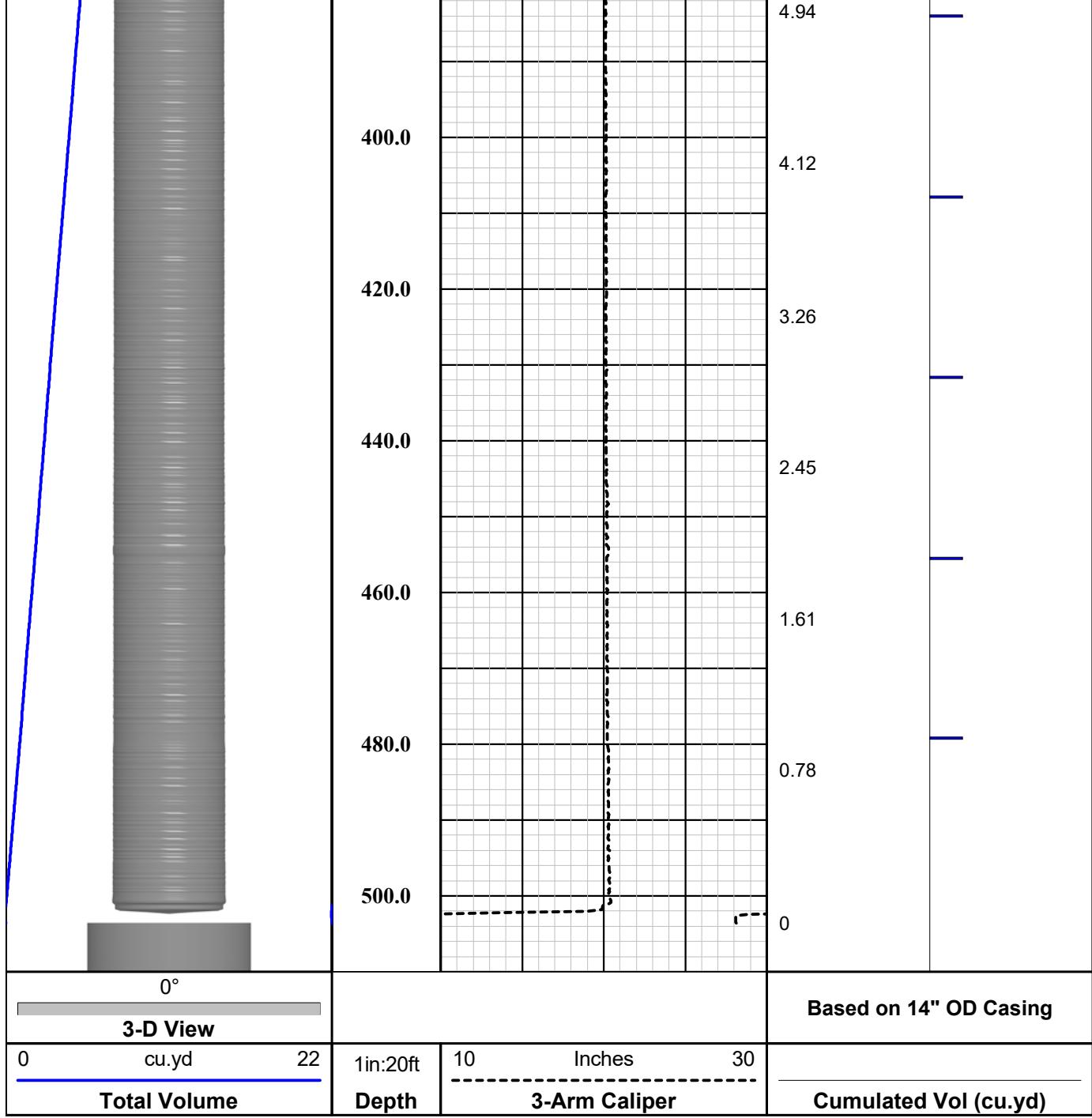
Calibration Points: 8" & 23"

Disclaimer:

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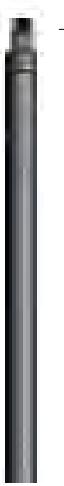






MSI Gamma-Caliper-Temperature-Fluid Resistivity

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft

Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)

Pressure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 0.76 m (29.75 in)

***NOTE: Lengths on a particular tool may vary from those listed on
this document due to probe sizes and styles utilized***

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter



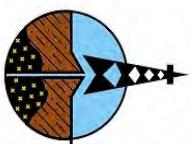
**Southwest Exploration
Services, LLC**

borehole geophysics & video services

Company	FLORENCE COPPER
Well	R-07
Field	FLORENCE COPPER
County	PINAL
State	ARIZONA

Final

Caliper w / Volume Calculation Summary



Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	FLORENCE COPPER		
WELL ID	R-07		
FIELD	FLORENCE COPPER		
COUNTY	PINAL		
STATE	ARIZONA		
TYPE OF LOGS: 3-ARM CALIPER MORE: W/ VOLUME CALC.			OTHER SERVICES
LOCATION	DEVIATION NAT. GAMMA TEMPERATURE FLUID RESISTIVITY		
SEC	TWP	RGE	ELEVATION
PERMANENT DATUM	GROUND LEVEL	ABOVE PERM. DATUM	K.B. D.F. G.L.
DATE	1-5-18	TYPE FLUID IN HOLE	MUD
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	VOLUME CALCULATION	VISCOSITY	N/A
DEPTH-DRILLER	1244 FT.	LEVEL	FULL
DEPTH-LOGGER	1244 FT.	MAX. REC. TEMP.	26.11 DEG. C
BTM LOGGED INTERVAL	1244 FT.	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	450 FT.	SAMPLE INTERVAL	0.2 FT.
DRILLER / RIG#	HYDRO RESOURCES	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	A. OLSON / E. TURNER	TOOL STRING/SN	MSI COMBO TOOL SN 5543
WITNESSED BY	COLLIN/ SCOTT - H&A	LOG TIME:ON SITE/OFF SITE	5:00 P.M.
RUN	BOREHOLE RECORD		CASING RECORD
NO.	BIT	FROM	TO
1	? IN.	SURFACE	40 FT.
2	20 IN.	40 FT.	506 FT.
3	12 1/4 IN.	TOTAL DEPTH	
COMMENTS:			

Tool Summary:	
Date	1-5-18
Run No.	1
Tool Model	MSI COMBO TOOL
Tool SN	5543
From	450 FT.
To	1244 FT.
Recorded By	A. OLSON
Truck No	200
Operation Check	1-4-18
Calibration Check	1-4-18
Time Logged	5:40 P.M.
Date	1-5-18
Run No.	2
Tool Model	MSI DEVIATION
Tool SN	3082
From	500 FT.
To	1240 FT.
Recorded By	A. OLSON
Truck No	200
Operation Check	1-4-18
Calibration Check	N/A
Time Logged	6:30 P.M.

Date		Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model		Tool Model		Tool Model	
Tool SN		Tool SN		Tool SN	
From		From		From	
To		To		To	
Recorded By		Recorded By		Recorded By	
Truck No		Truck No		Truck No	
Operation Check		Operation Check		Operation Check	
Calibration Check		Calibration Check		Calibration Check	
Time Logged		Time Logged		Time Logged	

Additional Comments:

Caliper Arms Used: 15 IN.

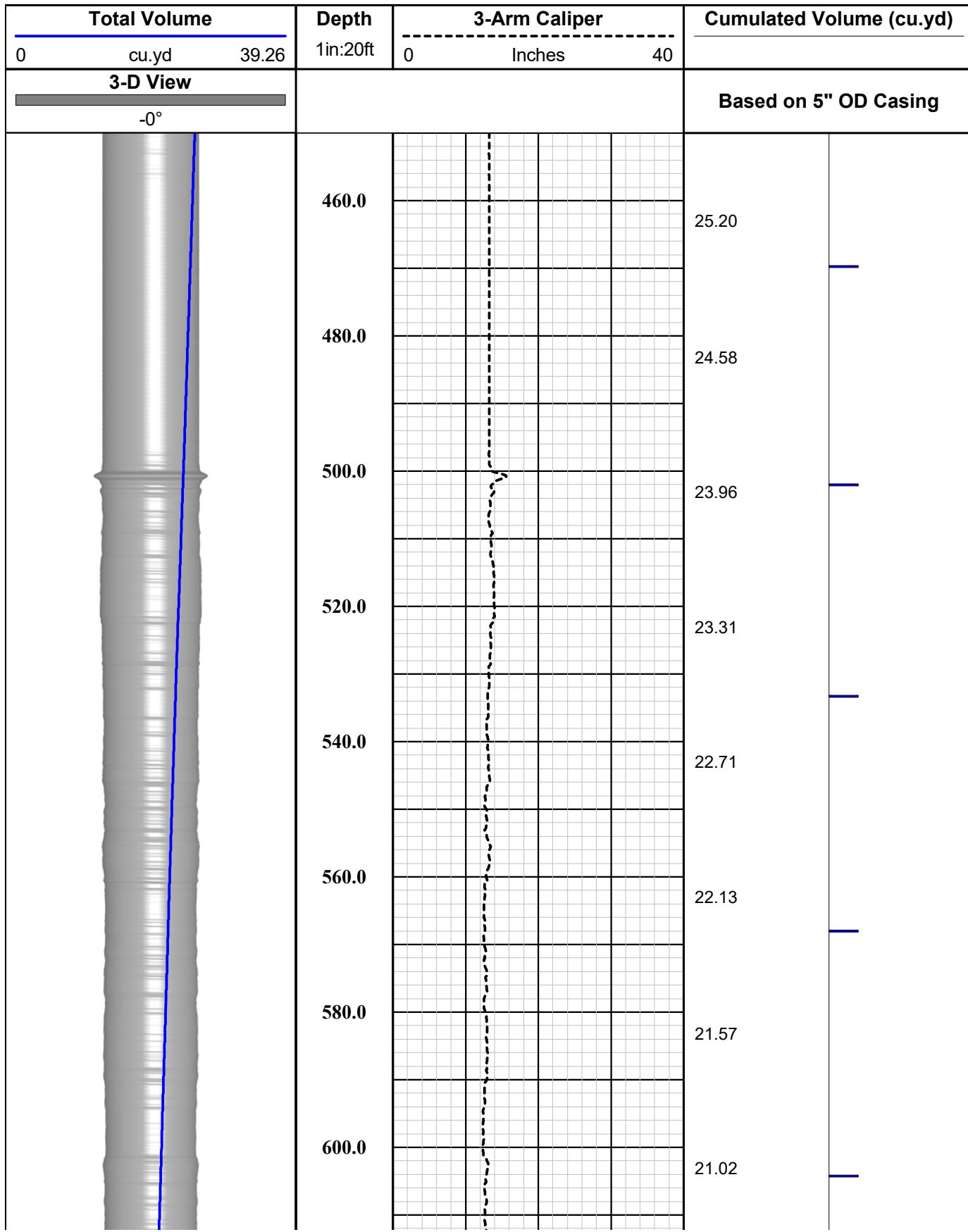
Calibration Points: 8 IN. & 23 IN.

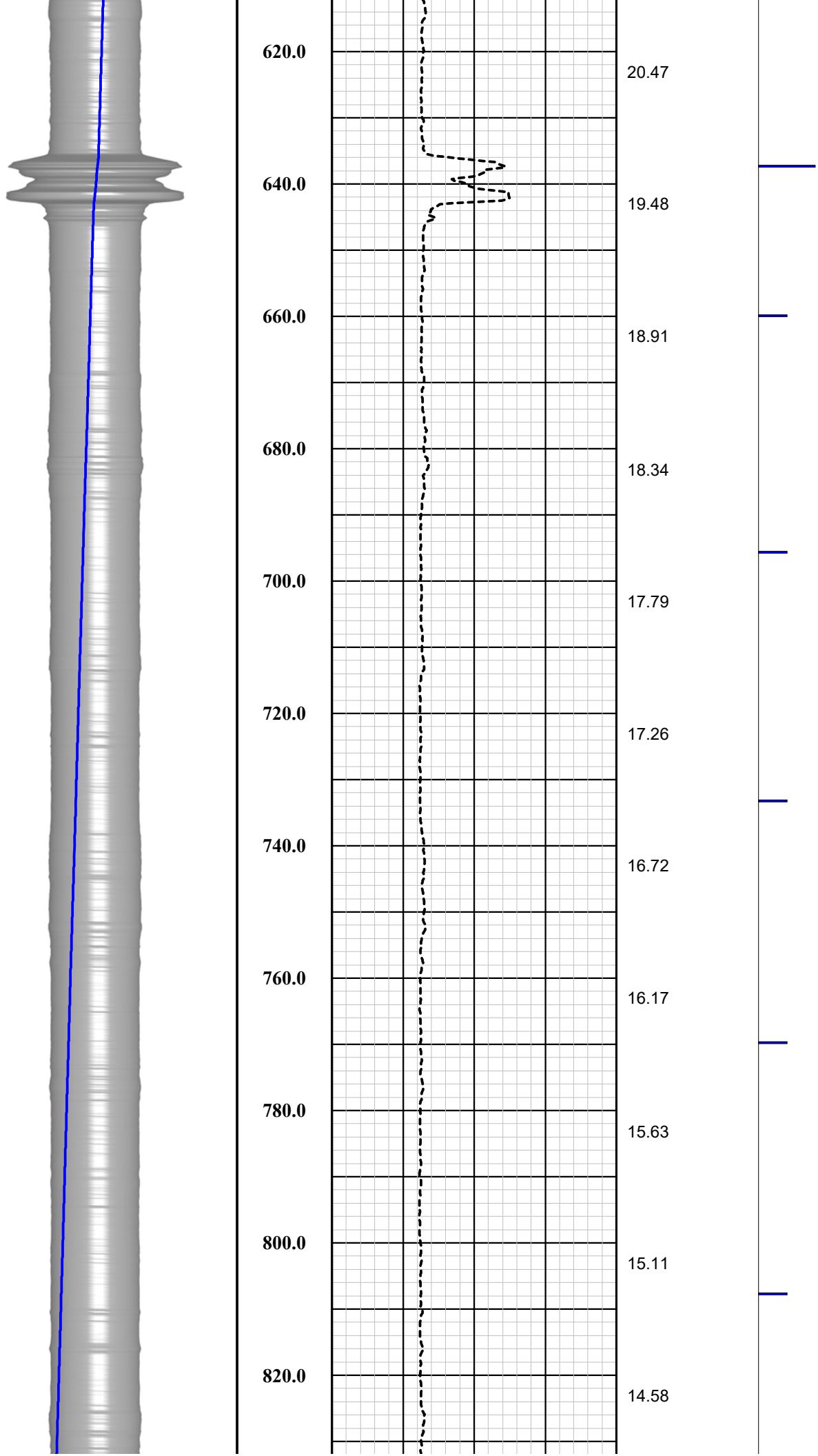
E-Log Calibration Range: N/A

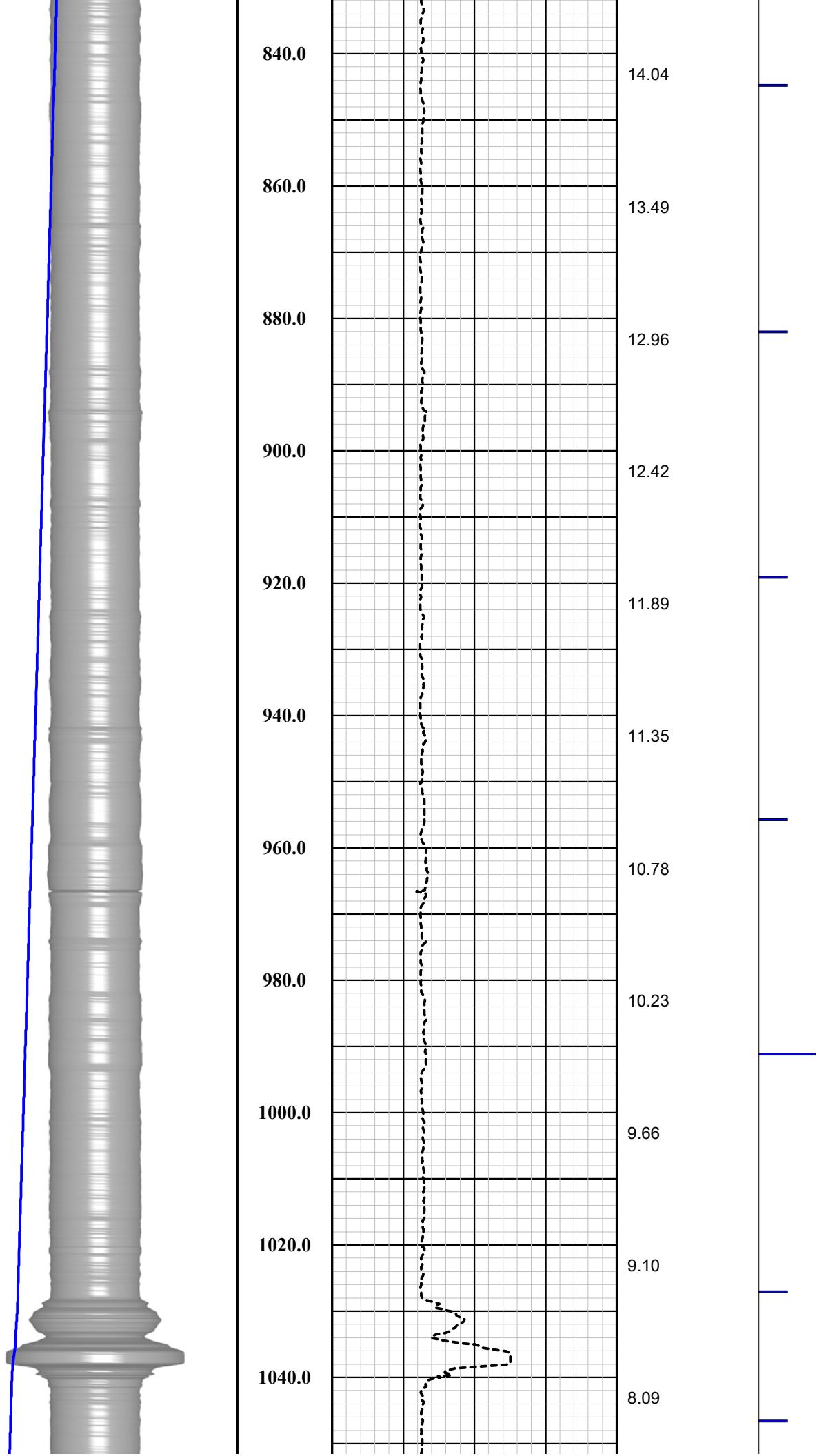
Calibration Points: N/A

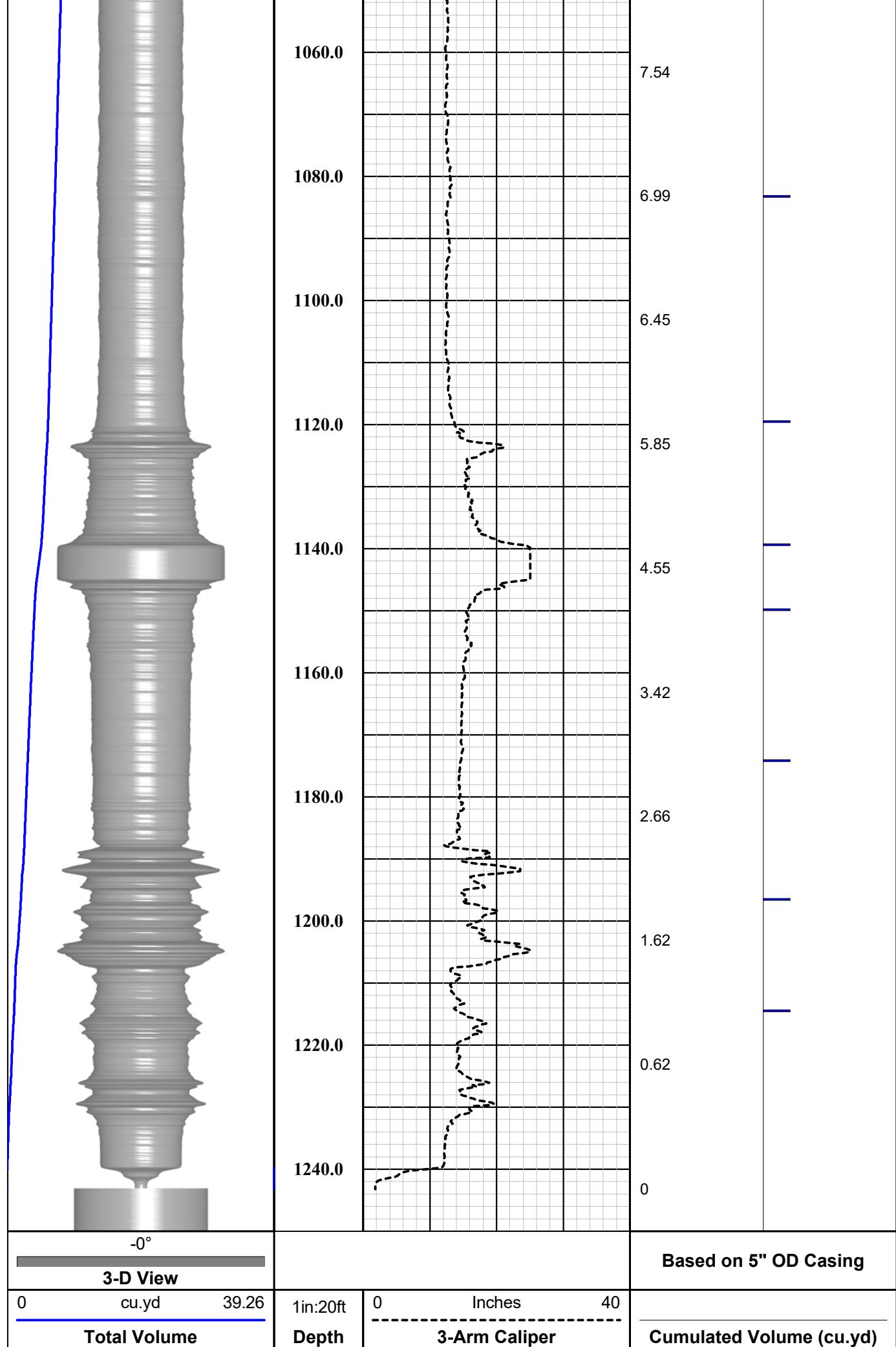
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MSI Gamma-Caliper-Temperature-Fluid Resistivity

Probe Top = Depth Ref.



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**Southwest Exploration
Services, LLC**

borehole geophysics & video services

Company	FLORENCE COPPER
Well	R-07
Field	FLORENCE COPPER
County	PINAL
State	ARIZONA

Final

Caliper w / Volume Calculation Summary

Drift Report

Wellbore DRIFT Interpretation

PREPARED ESPECIALLY FOR
FLORENCE COPPER

R-07

Sunday - November 19, 2017

This Wellbore Interpretation Package represents our best efforts to provide a correct interpretation. Nevertheless, since all interpretations are opinions based on inferences from electrical or other types of measurements, we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by Customer resulting from any interpretation made by this document. We do not warrant or guarantee the accuracy of the data, specifically including (but without limitations) the accuracy of data transmitted by electronic process, and we will not be responsible for accidental or intentional interception of such data by third parties. Our employees are not empowered to change or otherwise modify the attached interpretation. Furthermore, along with Eagle Pro Software we do not warrant or guarantee the accuracy of the programming techniques employed to produce this document. By accepting this Interpretation Package, the Customer agrees to the foregoing, and to our General Terms and Conditions.



Southwest Exploration Services, LLC
(480) 926-4558

WELLBORE DRIFT INTERPRETATION

Southwest Exploration Services, LLC

(480) 926-4558

Company:	FLORENCE COPPER		Well Owner:									
County:	PINAL	State:	Arizona	Country:	United States							
Well Number:	R-07	Survey Date:	Sunday - November 19, 2017	Magnetic Declination:	Declination Correction Not Used							
Field:	FLORENCE COPPER		Drift Calculation Methodology:		Balanced Tangential Method							
Location:												
Remarks:												
Witness:	SCOTT - H&A	Vehicle No.:	900	Invoice No.:			Operator:	M. QUINONES	Well Depth:	500 Feet	Casing size:	20 Inches
Tool:	Compass - 6002		Lat.:			Long.:	Sec.:	Twp.:		Rge.:		

MEASURED DATA			DATA COMPUTATIONS							
DEPTHs, feet	INCLINATIONS, degrees	AZIMUTHs, degrees	TVD, feet	T. LATITUDE, feet	T. LONGITUDE, feet	DOGLEg SEV., degrees per 20 Feet	DOGLEg SEV., degrees per 100 feet	DRIFT DIST., feet	DRIFT BGR., degrees	
40	0.39	357.84	40.00							
60	0.12	171.32	59.99	0.047	0.001	0.96	6.29	0.05' (.60")	000.70	
80	0.21	212.15	79.98	-0.005	-0.015	0.84	2.20	0.02' (.24")	252.80	
100	0.11	112.19	99.98	-0.043	-0.017	0.42	4.82	0.05' (.60")	201.10	
120	0.04	312.33	119.97	-0.046	-0.004	0.14	6.20	0.05' (.60")	185.50	
140	0.09	041.30	139.96	-0.029	0.001	0.42	4.41	0.03' (.36")	177.70	
160	0.10	323.48	159.95	-0.003	0.001	0.84	3.96	0.00' (.00")	162.80	
180	0.03	000.10	179.94	0.016	-0.009	0.95	1.98	0.02' (.24")	330.00	
200	0.21	342.65	199.93	0.056	-0.020	0.39	0.96	0.06' (.72")	340.50	
220	0.33	330.13	219.92	0.141	-0.060	1.00	0.69	0.15' (1.80")	337.10	
240	0.24	352.40	239.91	0.232	-0.094	1.00	1.22	0.25' (3.00")	337.90	
260	0.27	355.88	259.90	0.321	-0.103	0.36	0.19	0.34' (4.08")	342.20	
280	0.28	009.96	279.89	0.416	-0.098	0.94	0.77	0.43' (5.16")	346.80	
300	0.24	349.12	299.88	0.505	-0.097	0.79	1.14	0.51' (6.12")	349.10	
320	0.15	354.46	319.87	0.572	-0.107	0.50	0.29	0.58' (6.96")	349.40	
340	0.25	328.47	339.86	0.635	-0.132	0.03	1.42	0.65' (7.80")	348.20	
360	0.19	359.08	359.85	0.705	-0.155	0.53	1.66	0.72' (8.64")	347.60	
380	0.25	358.46	379.84	0.782	-0.157	0.75	0.03	0.80' (9.60")	348.70	

Page No. 1 True Vertical Depth: **502.77'** Final Drift Distance: **1.20'** (14.40") Final Drift Bearing: **333.60°**

Note: Magnetic Declination is not used because it is not a factor in the calculation of well drift or alignment. Magnetic Declination is only important if attempting to hit a target or miss another well and then it is included in the calculations.

WELLBORE DRIFT INTERPRETATION

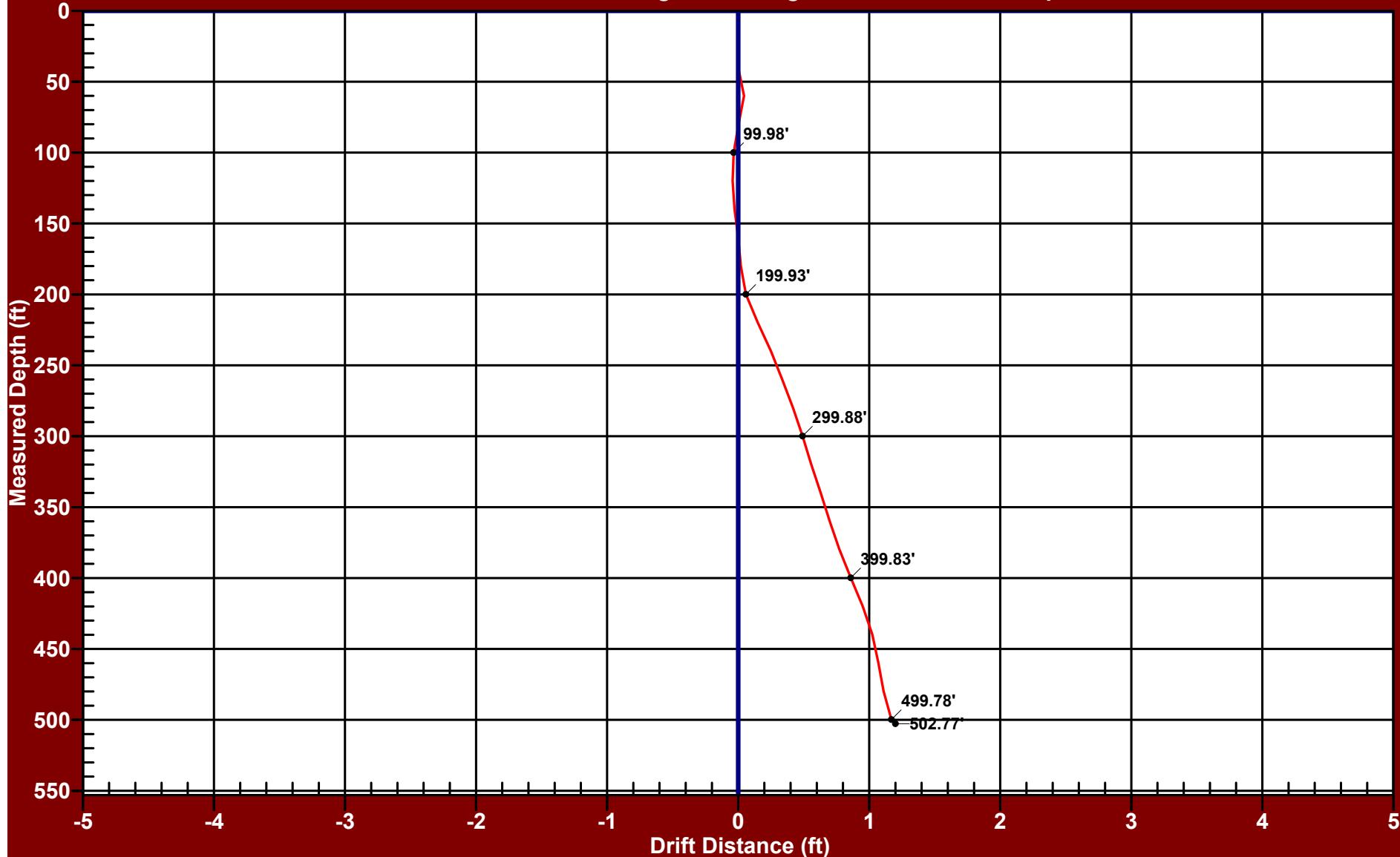
Southwest Exploration Services, LLC
(480) 926-4558

R-07

PLANE OF DRIFT VIEW - R-07

FLORENCE COPPER

Drift Distance = 1.20 Feet Drift Bearing = 333.6 Degrees True Vertical Depth = 502.77 Feet



Date of Survey: Sunday - November 19, 2017

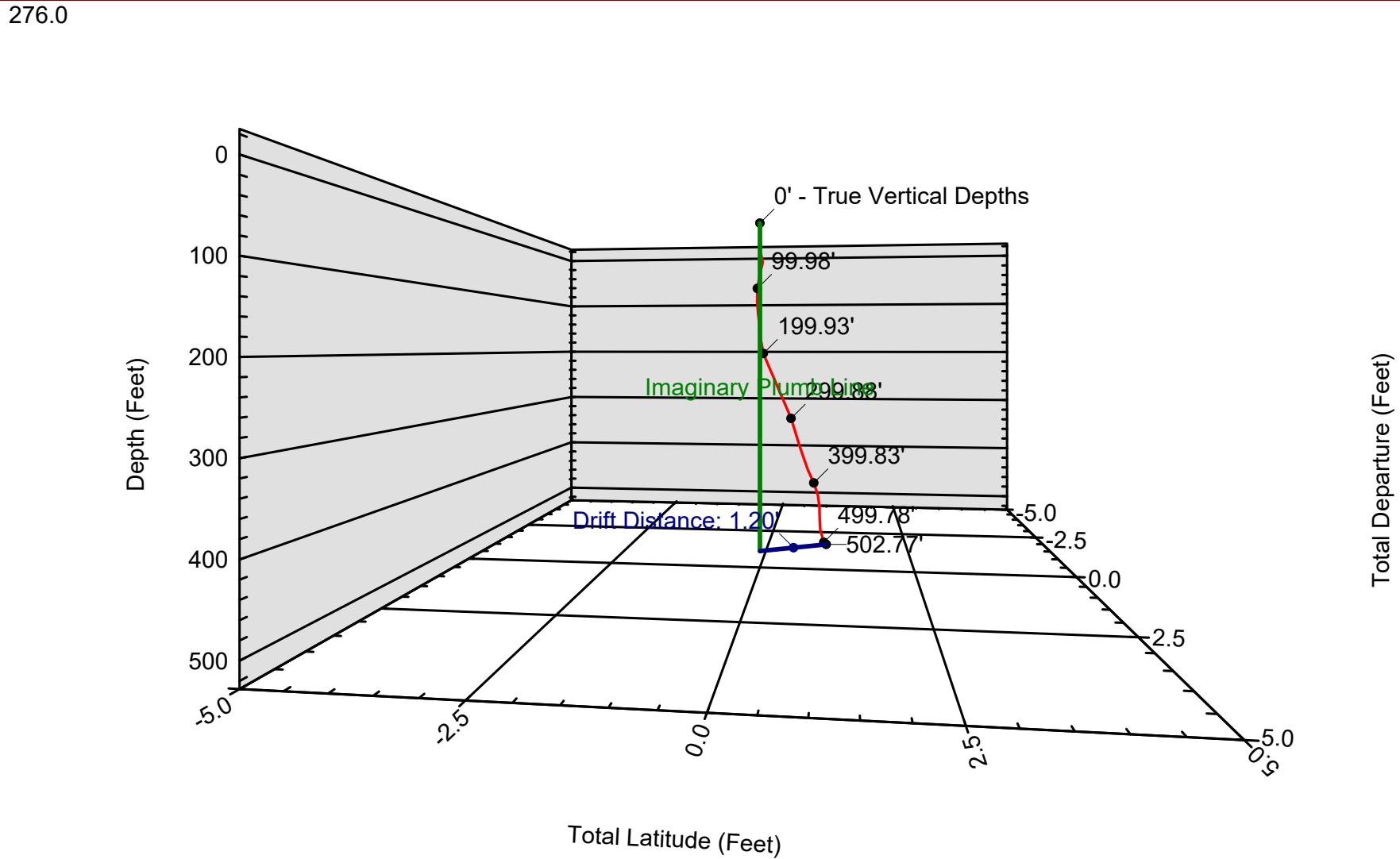
Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

3D PROJECTION VIEW - R-07

FLORENCE COPPER

Drift Distance = 1.20 Feet Drift Bearing = 333.6 Degrees True Vertical Depth = 502.77 Feet



Date of Survey: Sunday - November 19, 2017

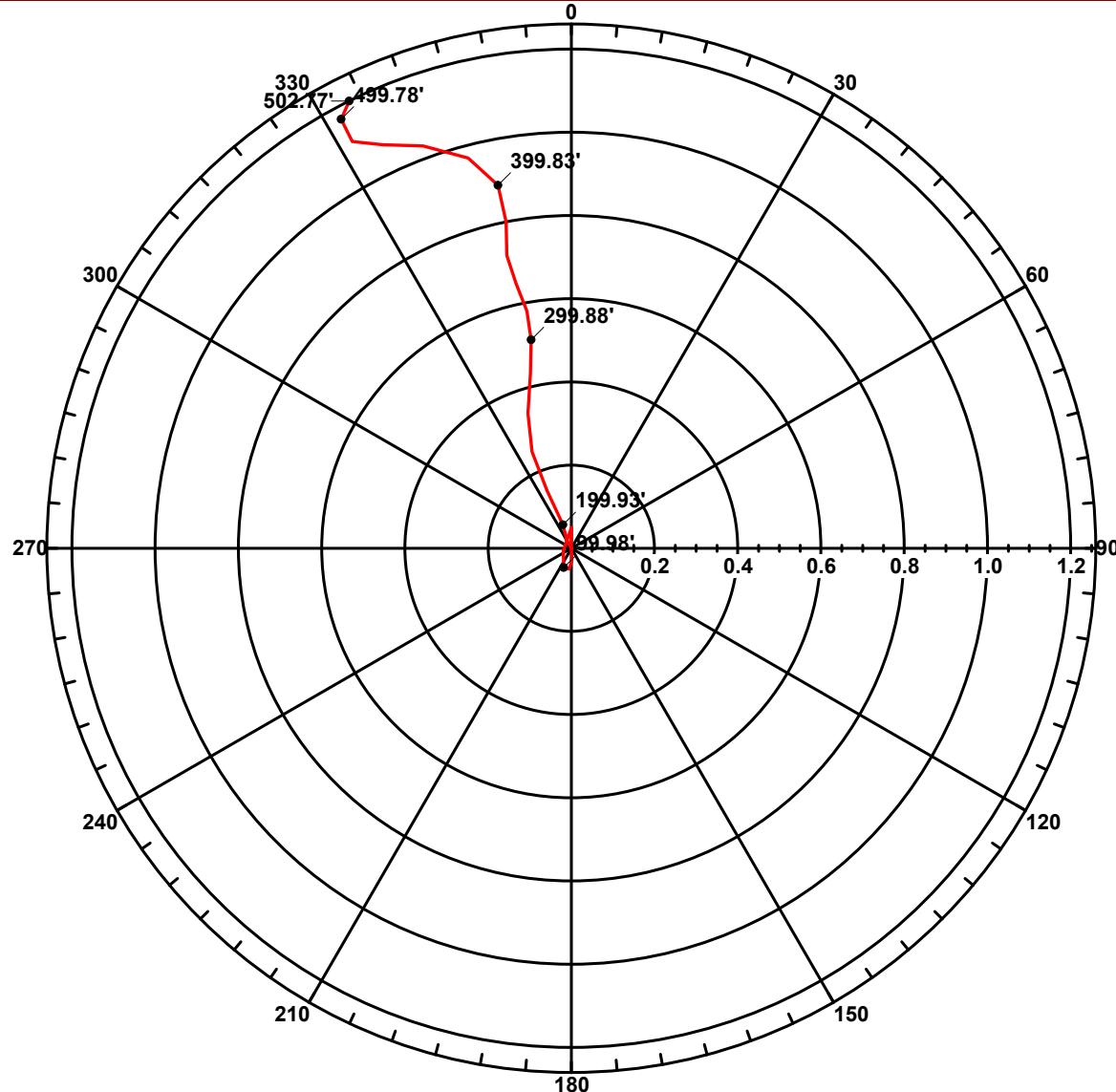
Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

POLAR VIEW - R-07

FLORENCE COPPER

Drift Distance = 1.20 Feet Drift Bearing = 333.6 Degrees True Vertical Depth = 502.77 Feet



Date of Survey: Sunday - November 19, 2017

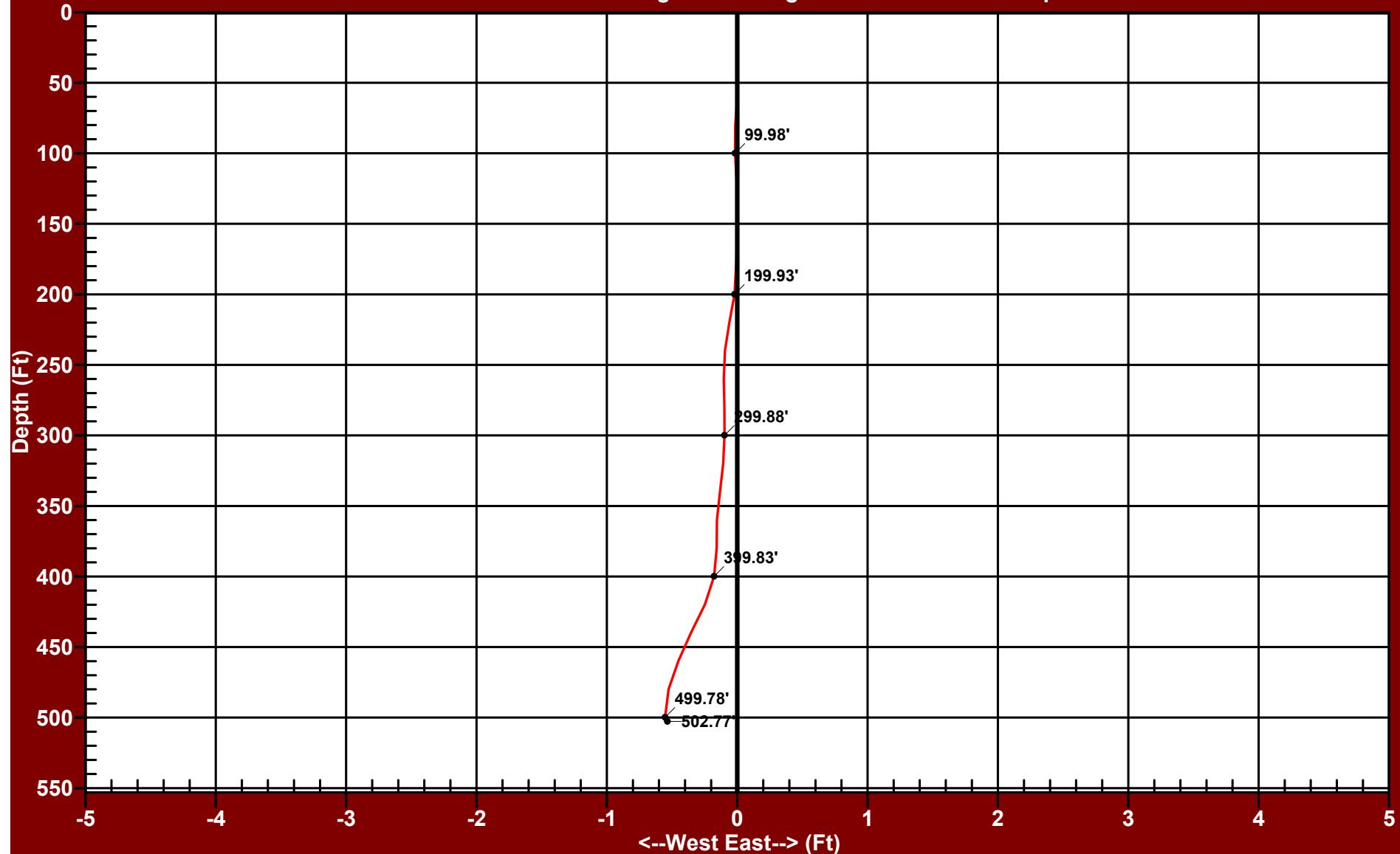
Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

EASTING RECTANGULAR VIEW - R-07

FLORENCE COPPER

Drift Distance = 1.20 Feet Drift Bearing = 333.6 Degrees True Vertical Depth = 502.77 Feet



Date of Survey: Sunday - November 19, 2017

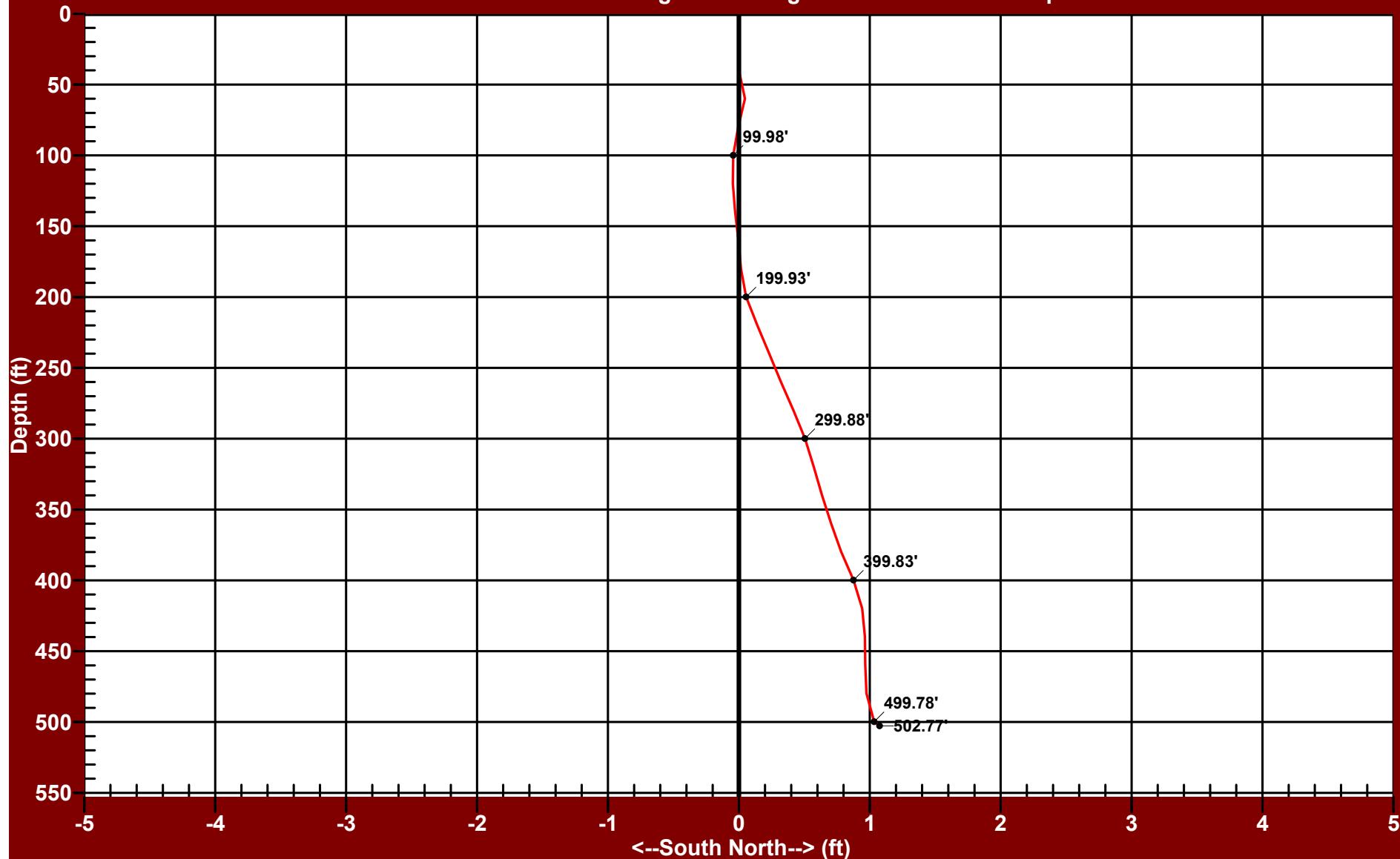
Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

NORTHING RECTANGULAR VIEW - R-07

FLORENCE COPPER

Drift Distance = 1.20 Feet Drift Bearing = 333.6 Degrees True Vertical Depth = 502.77 Feet



Date of Survey: Sunday - November 19, 2017

Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

Drift Report

Wellbore DRIFT Interpretation

PREPARED ESPECIALLY FOR
FLORENCE COPPER

R-07

Monday - January 1, 2018

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Southwest Exploration Services, LLC
(480) 926-4558

WELLBORE DRIFT INTERPRETATION

Southwest Exploration Services, LLC

(480) 926-4558

Company:	FLORENCE COPPER		Well Owner:									
County:	PINAL	State:	Arizona	Country:	USA							
Well Number:	R-07	Survey Date:	Monday - January 1, 2018	Magnetic Declination:	Declination Correction Not Used							
Field:	FLORENCE COPPER		Drift Calculation Methodology:		Balanced Tangential Method							
Location:												
Remarks:												
Witness:	KENDRA - H&A	Vehicle No.:	200	Invoice No.:			Operator:	A. OLSON	Well Depth:	1220 Feet	Casing size:	12.25 Inches
Tool:	Compass - 3082		Lat.:			Long.:	Sec.:		Twp.:		Rge.:	

MEASURED DATA			DATA COMPUTATIONS							
DEPTHs, feet	INCLINATIONS, degrees	AZIMUTHs, degrees	TVD, feet	T. LATITUDE, feet	T. LONGITUDE, feet	DOGLEg SEV., degrees per 20 Feet	DOGLEg SEV., degrees per 100 feet	DRIFT DIST., feet	DRIFT BGR., degrees	
500	0.21	132.30	500.00							
520	0.43	343.11	519.99	0.047	0.005	0.95	22.34	0.05' (.60")	006.40	
540	0.15	009.41	539.98	0.145	-0.013	0.18	5.27	0.15' (1.80")	355.10	
560	0.33	358.63	559.97	0.228	-0.010	0.37	2.18	0.23' (2.76")	357.50	
580	0.38	032.91	579.96	0.341	0.025	0.20	6.83	0.34' (4.08")	004.10	
600	0.37	014.43	599.95	0.459	0.077	0.94	3.72	0.47' (5.64")	009.50	
620	0.29	355.12	619.94	0.572	0.089	1.00	3.88	0.58' (6.96")	008.80	
640	0.19	039.69	639.93	0.648	0.106	0.58	8.78	0.66' (7.92")	009.30	
660	0.33	036.91	659.92	0.720	0.162	0.98	0.56	0.74' (8.88")	012.70	
680	0.08	345.45	679.91	0.780	0.193	0.99	10.06	0.80' (9.60")	013.90	
700	0.14	322.46	699.90	0.813	0.175	0.55	4.62	0.83' (9.96")	012.10	
720	0.38	020.25	719.89	0.895	0.183	0.99	11.19	0.91' (10.92")	011.60	
740	0.37	045.03	739.88	1.003	0.252	0.90	4.97	1.03' (12.36")	014.10	
760	0.14	124.23	759.87	1.035	0.318	0.33	14.77	1.08' (12.96")	017.10	
780	0.40	099.77	779.86	1.009	0.407	0.22	4.91	1.09' (13.08")	022.00	
800	0.68	110.32	799.85	0.956	0.587	0.36	2.13	1.12' (13.44")	031.60	
820	0.74	118.99	819.84	0.852	0.811	0.86	1.75	1.18' (14.16")	043.60	
840	0.40	110.35	839.83	0.765	0.989	0.96	1.75	1.25' (15.00")	052.30	

Page No. 1 True Vertical Depth: 1219.54' Final Drift Distance: 12.04' (144.48") Final Drift Bearing: 121.70°

Note: Magnetic Declination is not used because it is not a factor in the calculation of well drift or alignment. Magnetic Declination is only important if attempting to hit a target or miss another well and then it is included in the calculations.

WELLBORE DRIFT INTERPRETATION

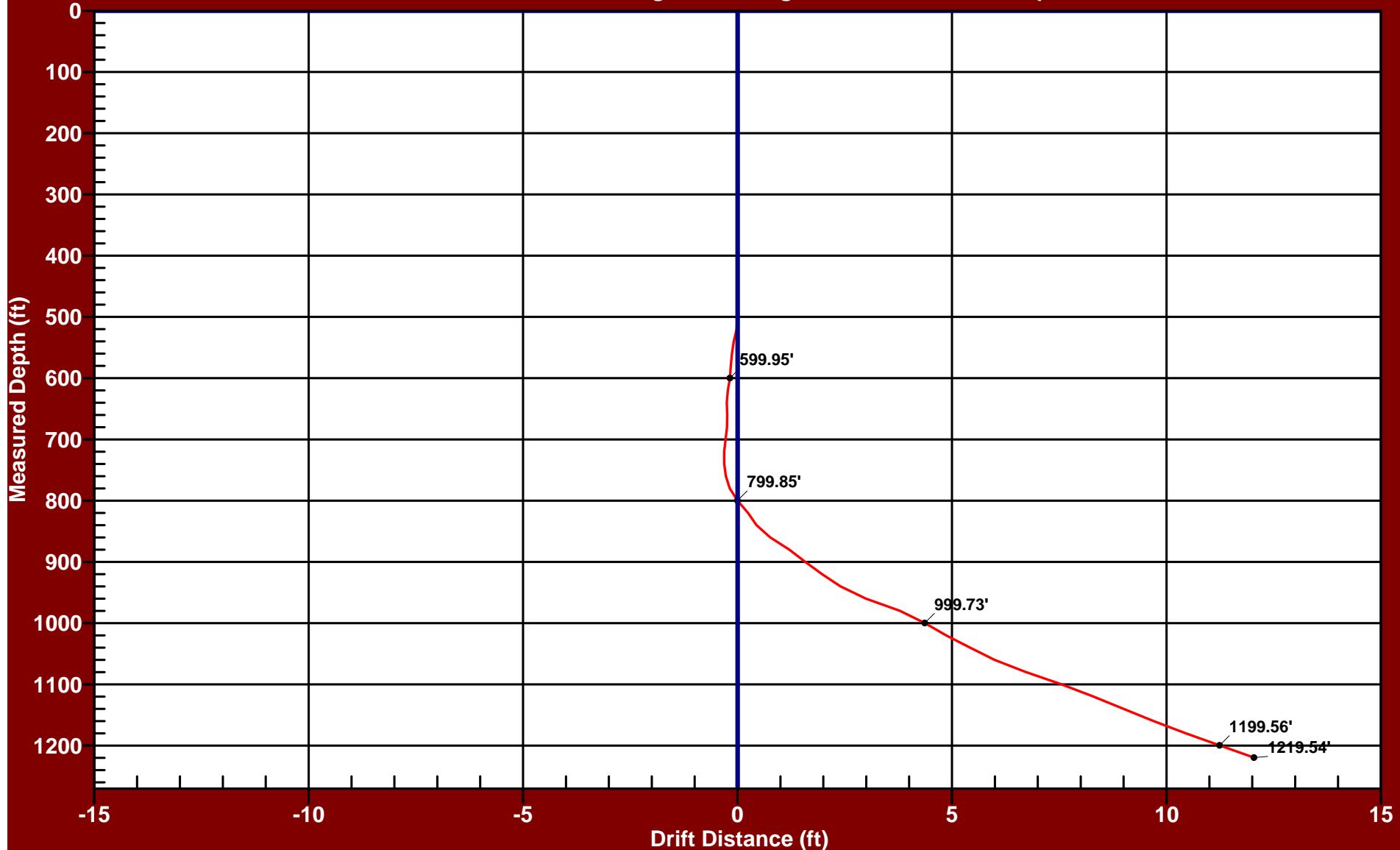
Southwest Exploration Services, LLC
(480) 926-4558

R-07

PLANE OF DRIFT VIEW - R-07

FLORENCE COPPER

Drift Distance = 12.04 Feet Drift Bearing = 121.7 Degrees True Vertical Depth = 1219.54 Feet



Date of Survey: Monday - January 1, 2018

Balanced Tangential Calculation Method

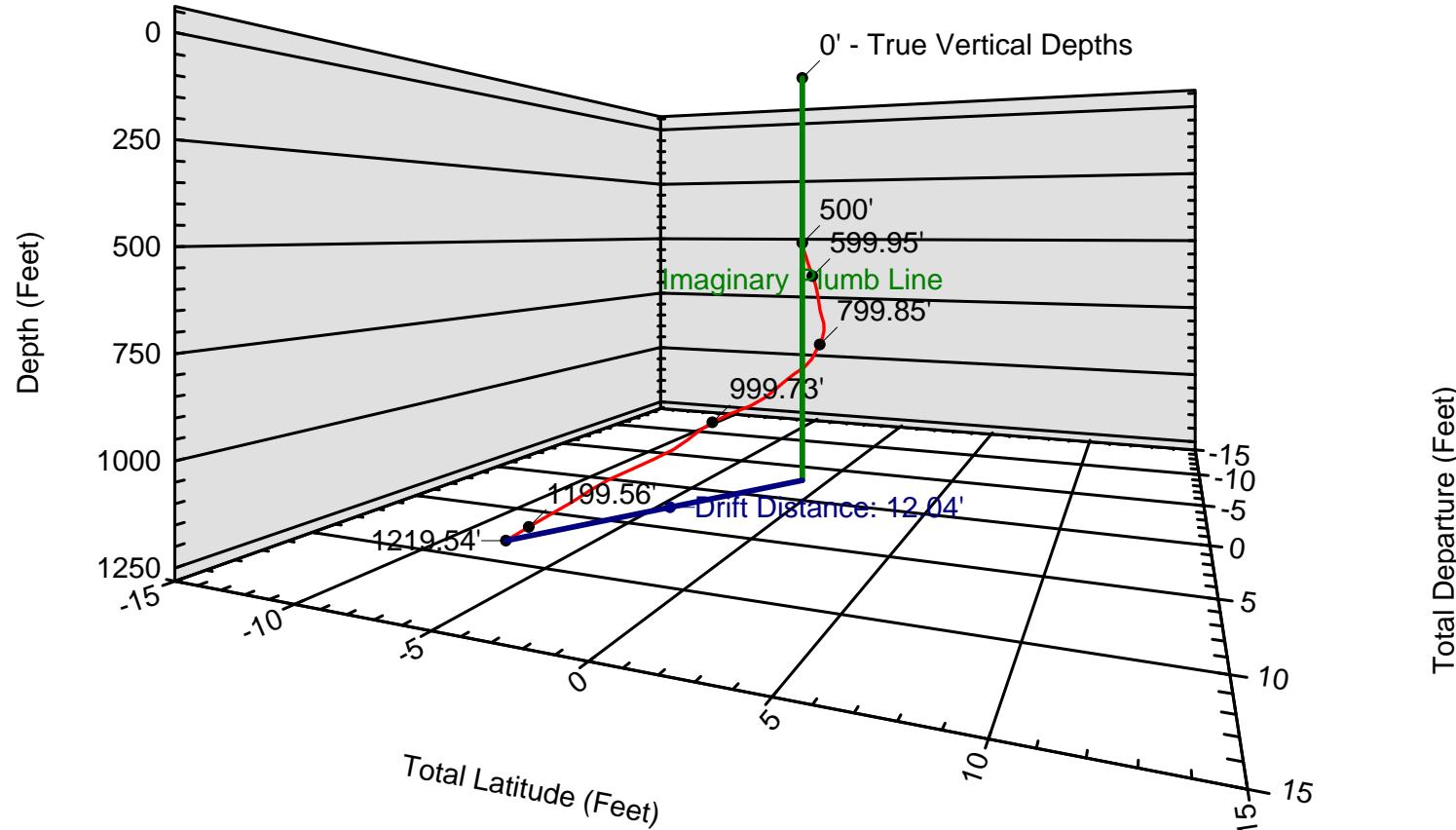
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3D PROJECTION VIEW - R-07

FLORENCE COPPER

Drift Distance = 12.04 Feet Drift Bearing = 121.7 Degrees True Vertical Depth = 1219.54 Feet

291.0



Date of Survey: Monday - January 1, 2018

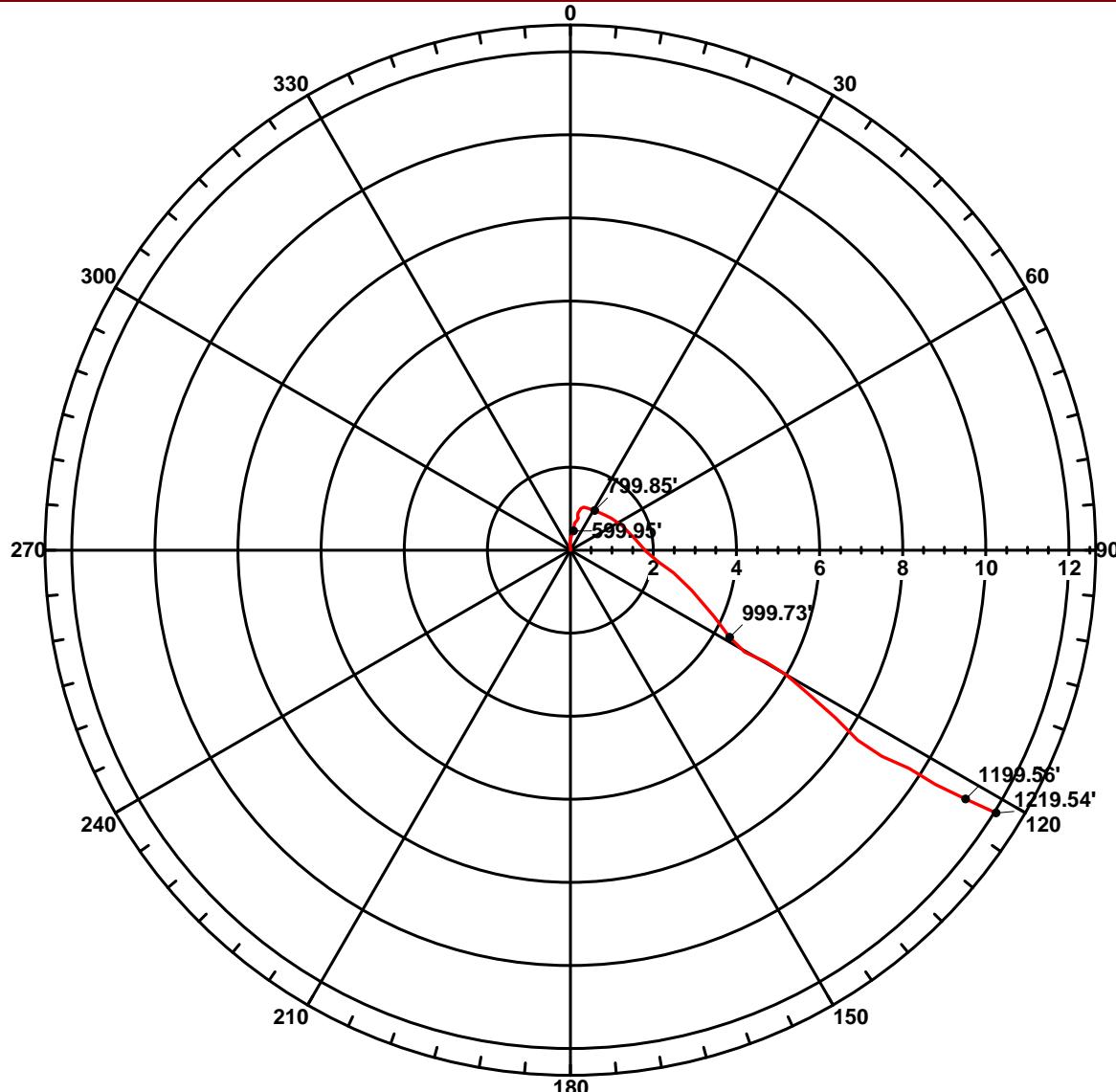
Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

POLAR VIEW - R-07

FLORENCE COPPER

Drift Distance = 12.04 Feet Drift Bearing = 121.7 Degrees True Vertical Depth = 1219.54 Feet



Date of Survey: Monday - January 1, 2018

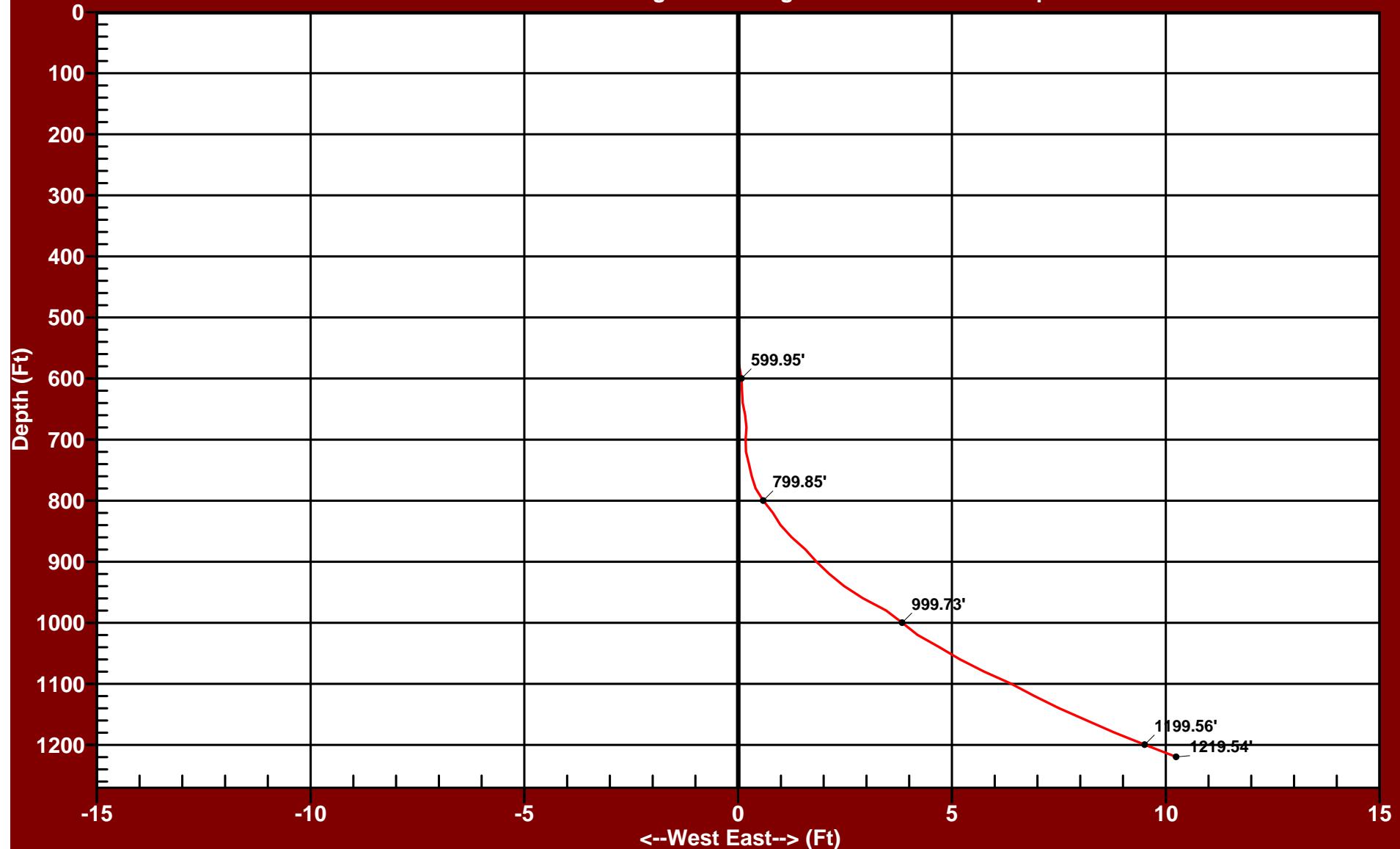
Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

EASTING RECTANGULAR VIEW - R-07

FLORENCE COPPER

Drift Distance = 12.04 Feet Drift Bearing = 121.7 Degrees True Vertical Depth = 1219.54 Feet



Date of Survey: Monday - January 1, 2018

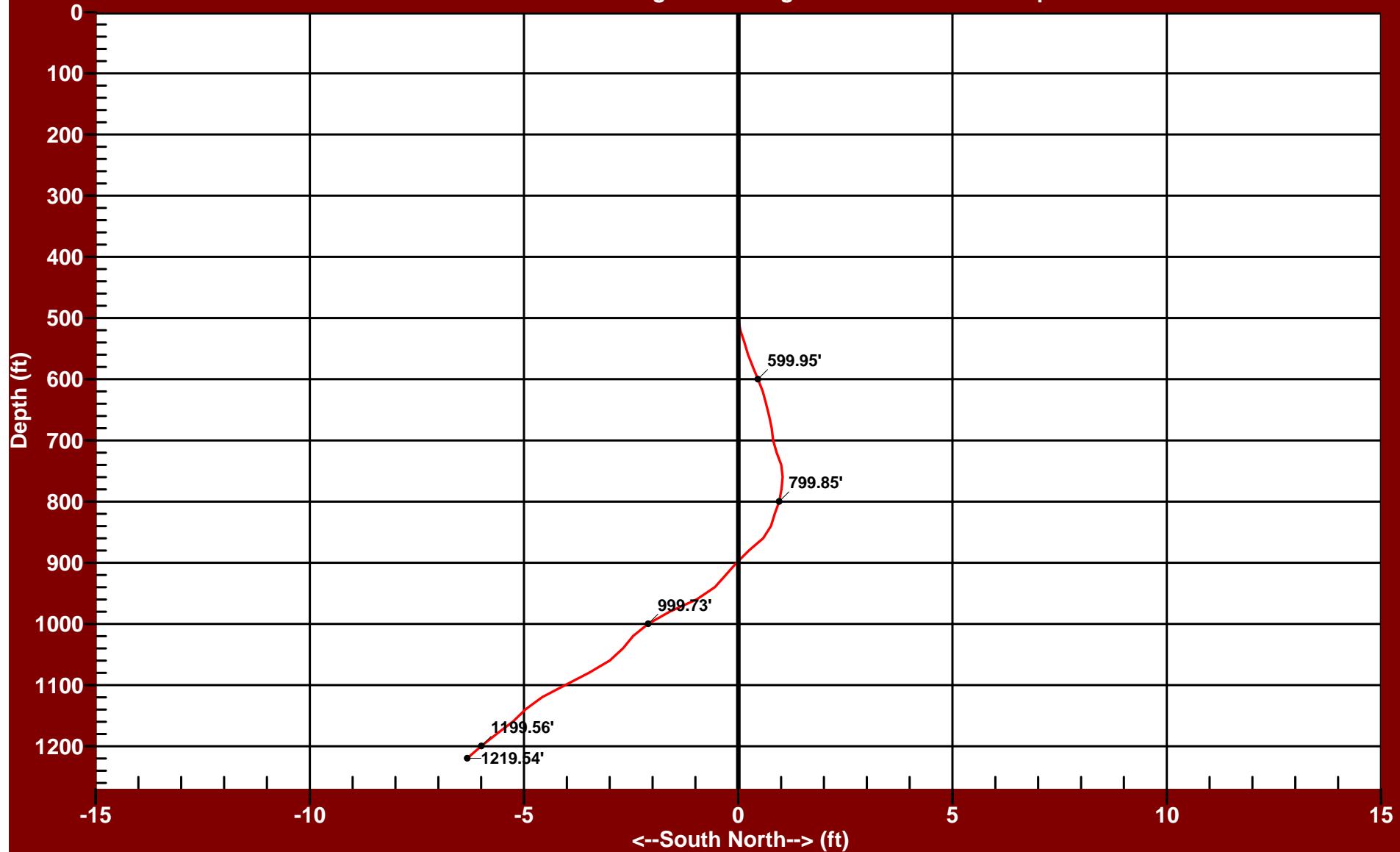
Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

NORTHING RECTANGULAR VIEW - R-07

FLORENCE COPPER

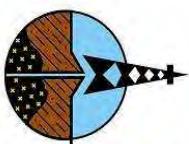
Drift Distance = 12.04 Feet Drift Bearing = 121.7 Degrees True Vertical Depth = 1219.54 Feet



Date of Survey: Monday - January 1, 2018

Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558



Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	FLORENCE COPPER		
WELL ID	R-07		
FIELD	FLORENCE COPPER		
COUNTY	PINAL		
STATE	ARIZONA		
TYPE OF LOGS: GAMMA - CALIPER MORE: TEMP./FLUID COND.			OTHER SERVICES SONIC 4 PI DENSITY DUAL DENSITY
LOCATION	SEC	TWP	RGE
PERMANENT DATUM	ELEVATION		
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F. G.L.
DRILLING MEAS. FROM GROUND LEVEL			
DATE	3-1-18		
RUN No	1		
TYPE LOG	GAMMA - CALIPER - FTC		
DEPTH-DRILLER	1200 FT.		
DEPTH-LOGGER	1154 FT.		
BTM LOGGED INTERVAL	1154 FT.		
TOP LOGGED INTERVAL	SURFACE		
DRILLER / RIG#	HYDRO RESOURCES		
RECORDED BY / Logging Eng.	A. OLSON / E. TURNER		
WITNESSED BY	KENDRA - H&A		
RUN	BOREHOLE RECORD		CASING RECORD
NO.	BIT	FROM	TO
1	?	SURFACE	40 FT.
2	20 IN.	40 FT.	500 FT.
3	12 1/4 IN.	500 FT.	TOTAL DEPTH
LOG TIME: ON SITE/OFF SITE			
8:00 A.M.			

Tool Summary:					
Date	3-1-18	Date	3-1-18	Date	3-1-18
Run No.	1	Run No.	2	Run No.	3
Tool Model	QL COMBO TOOL	Tool Model	ALT 4 RX SONIC	Tool Model	COMPROBE 4 PI
Tool SN	6161	Tool SN	4572	Tool SN	6009
From	SURFACE	From	200 FT.	From	SURFACE
To	1175 FT.	To	1175 FT.	To	1175 FT.
Recorded By	E. TURNER	Recorded By	E. TURNER	Recorded By	E. TURNER
Truck No	750	Truck No	750	Truck No	750
Operation Check	2-28-18	Operation Check	2-28-18	Operation Check	2-28-18
Calibration Check	2-28-18	Calibration Check	N/A	Calibration Check	N/A
Time Logged	12:00 P.M.	Time Logged	1:00 P.M.	Time Logged	1:30 P.M.

Date	3-1-18	Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model	ALT QL DENSITY	Tool Model		Tool Model	
Tool SN	6187	Tool SN		Tool SN	
From	SURFACE	From		From	
To	1175 FT.	To		To	
Recorded By	E. TURNER	Recorded By		Recorded By	
Truck No	750	Truck No		Truck No	
Operation Check	2-28-18	Operation Check		Operation Check	
Calibration Check	N/A	Calibration Check		Calibration Check	
Time Logged	2:15 P.M.	Time Logged		Time Logged	

Additional Comments:

Caliper Arms Used: 9 IN.

Calibration Points: 4 IN. & 12 IN.

Comments:

Calibration Points: N/A

E-Log Calibration Range: N/A

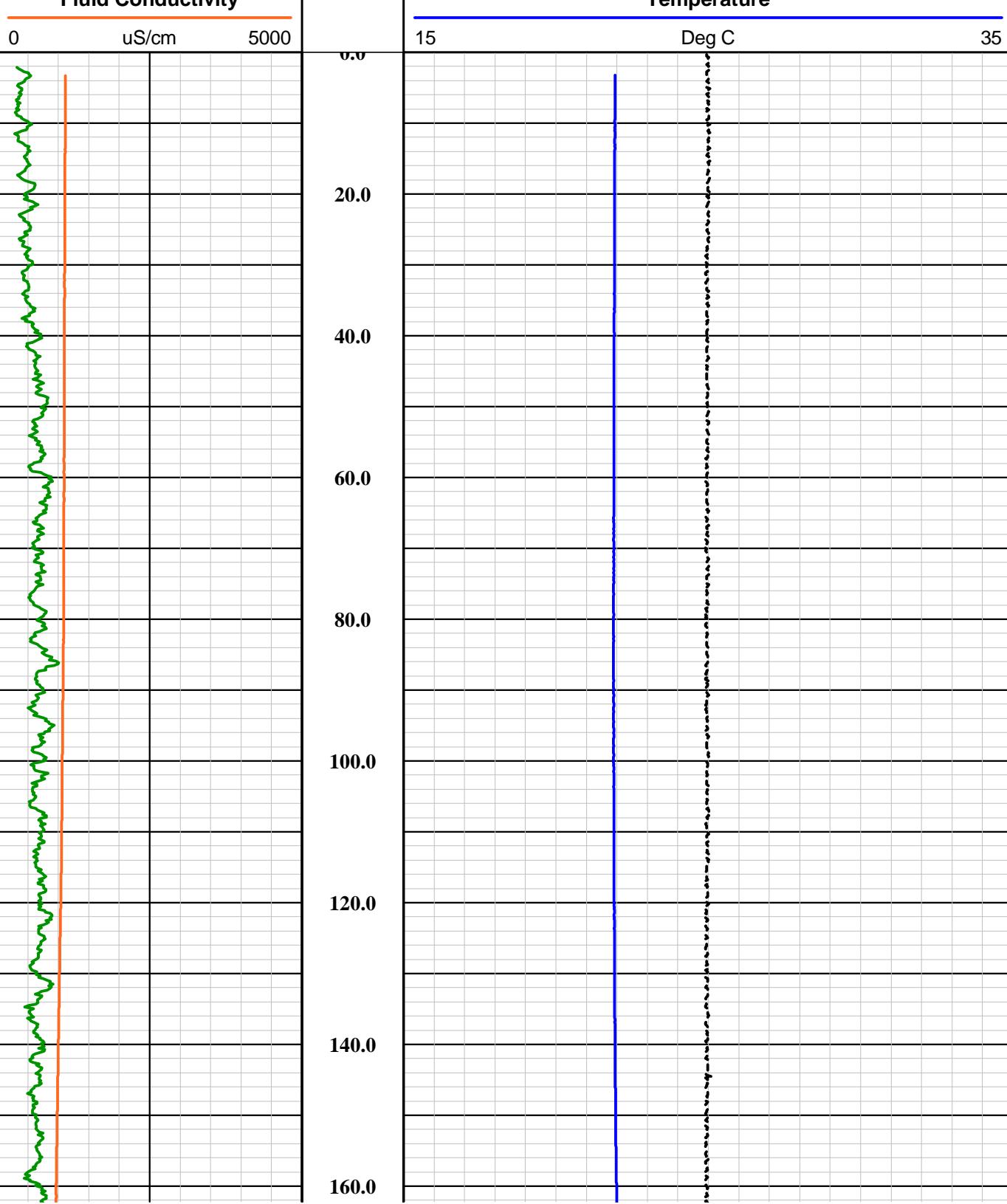
Calibration Points: N/A

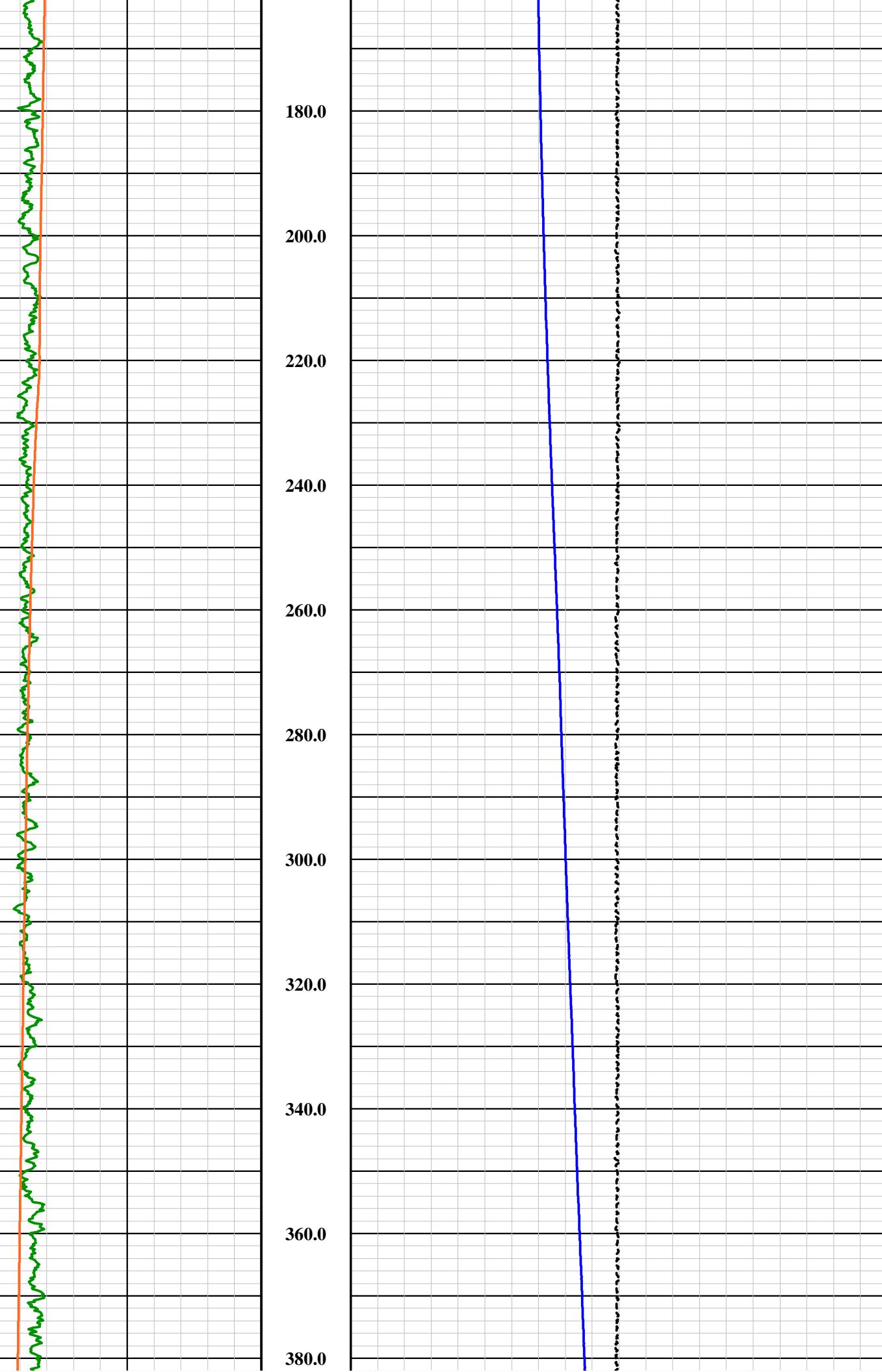
Disclaimer:

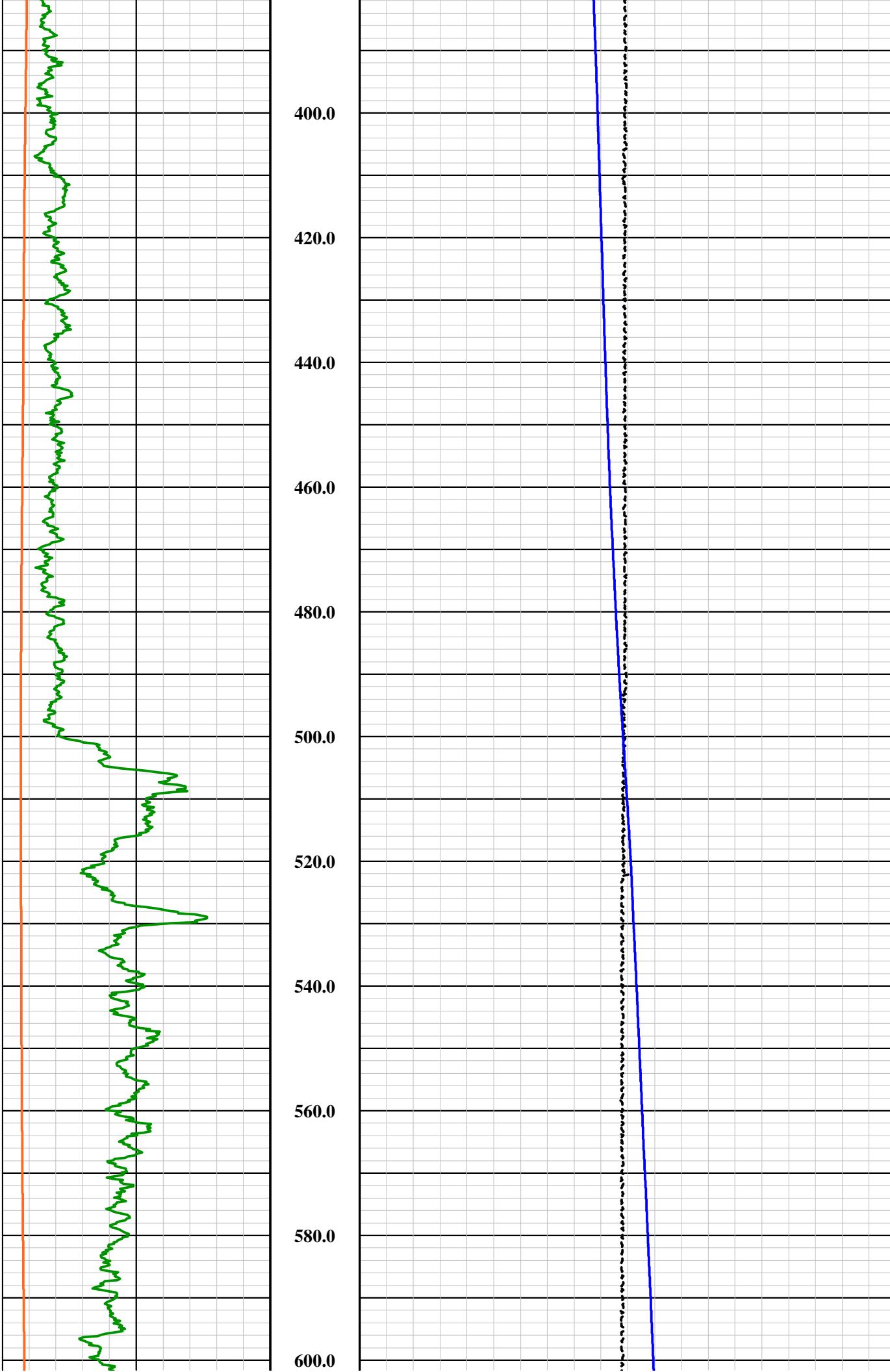
All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

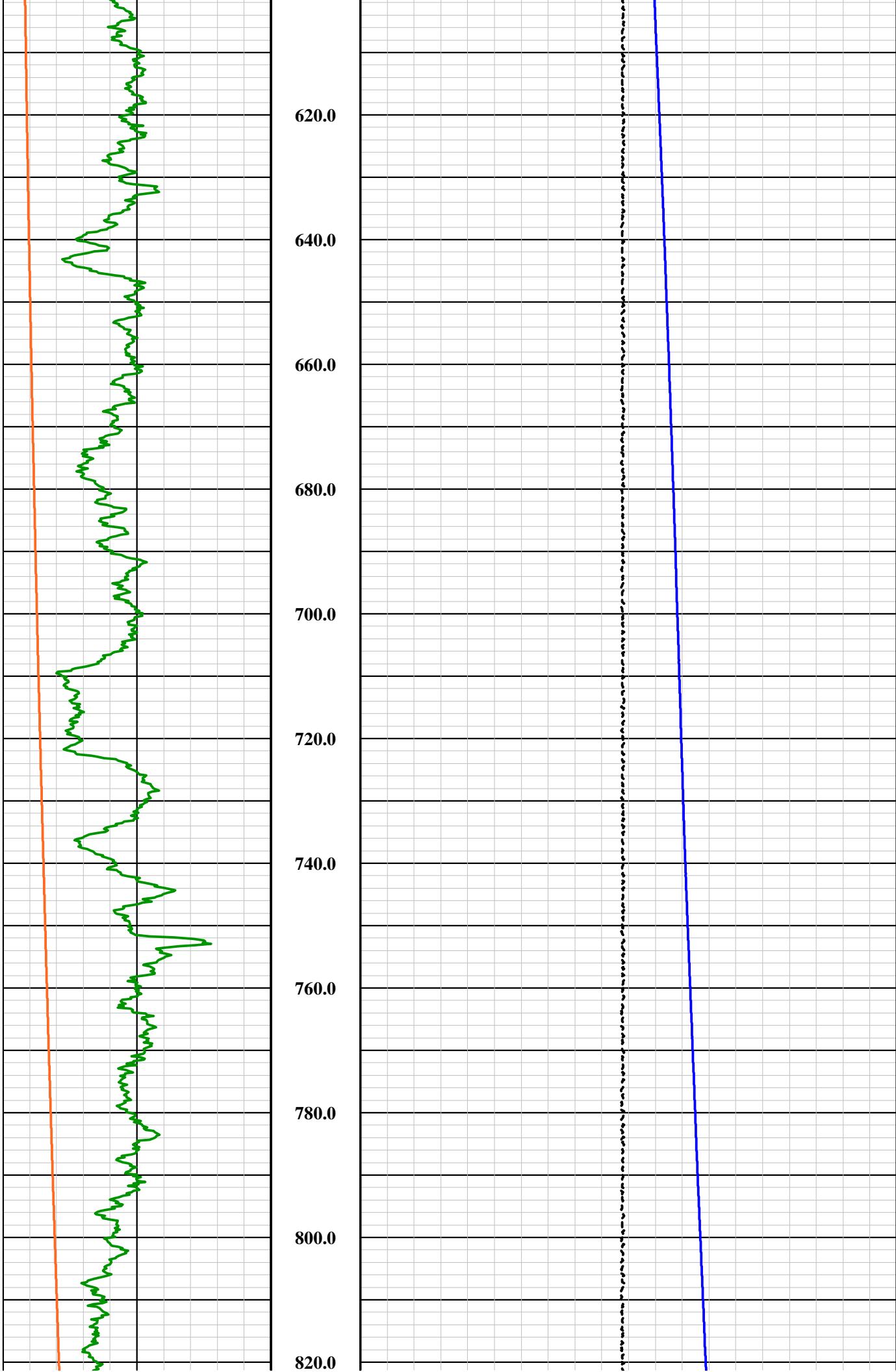
Nat. Gamma		Depth	3-Arm Caliper	
0	API	400	1in:20ft	0 Inches 10

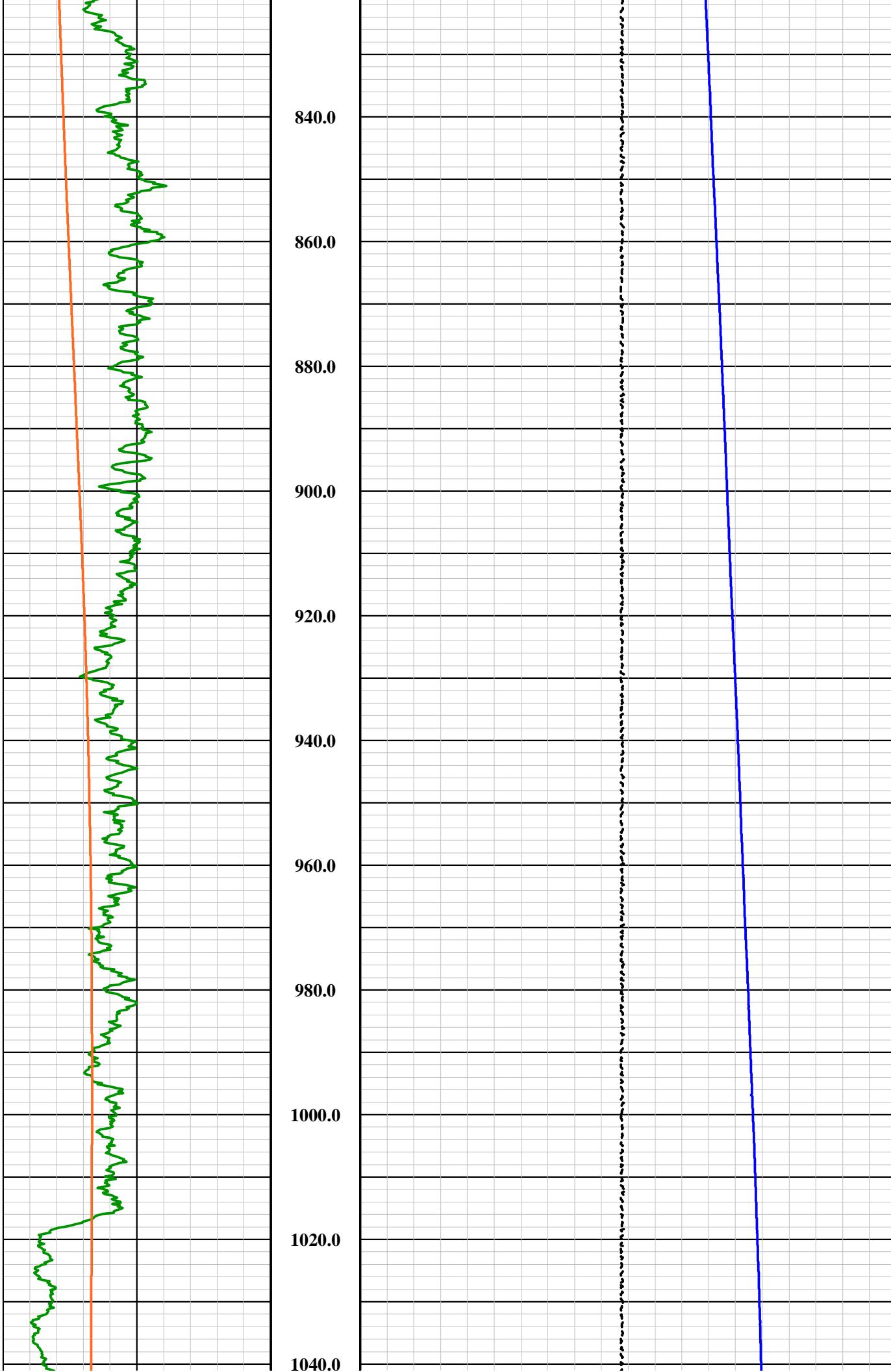
Fluid Conductivity			Temperature	
0	uS/cm	5000	15	Deg C 35

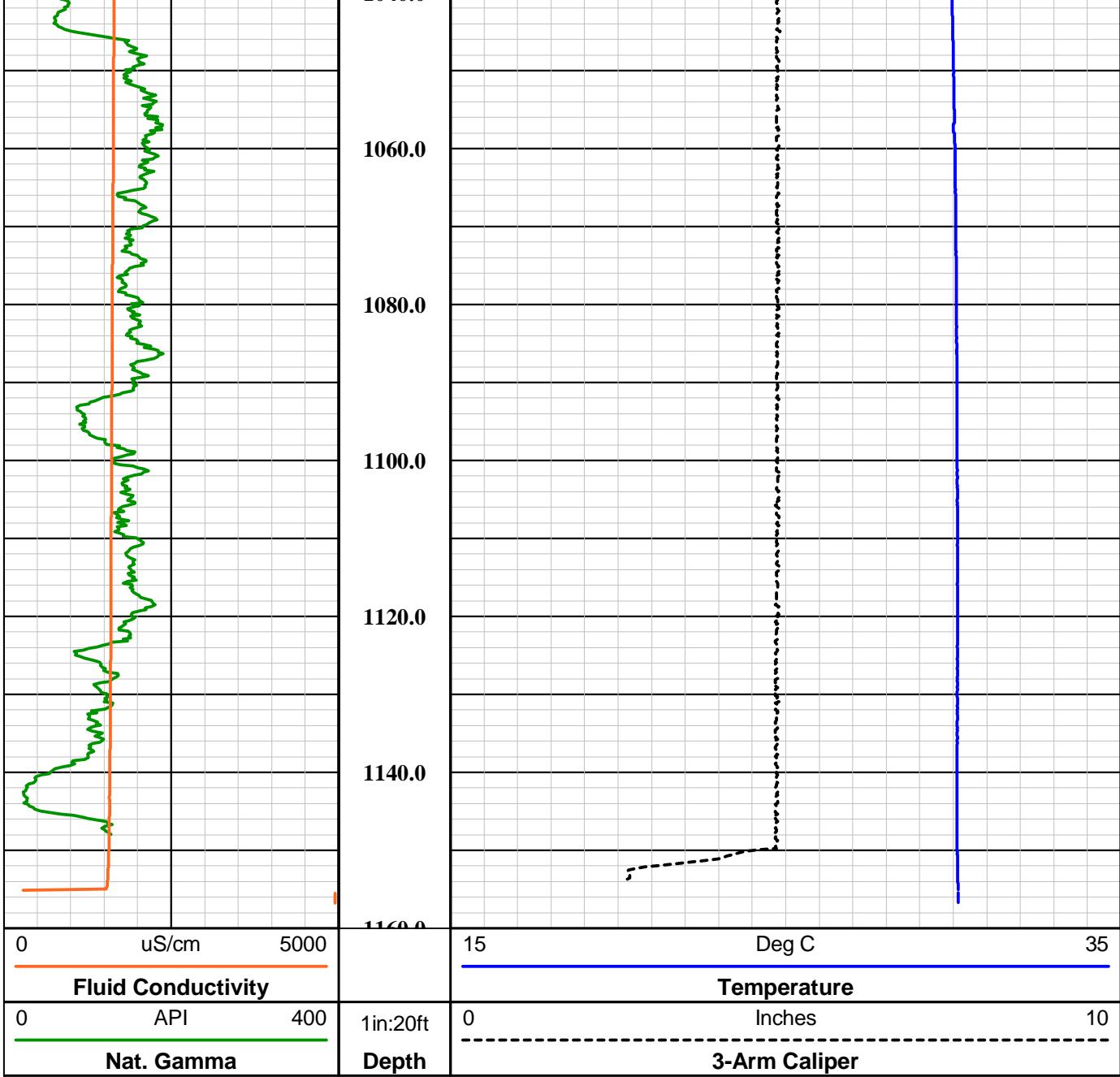












QL40 Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.

Tool SN: 5613, 5979, 6161 & 6292



Four Conductor MSI Probe Top

Probe Length = 3.69 m or 12.12 ft

Probe Weight = 18.195 kg or 40.11 lbs

Caliper arms can only collect data logging up hole

Fluid Temperature/Conductivity and Natural Gamma
can be collected logging up and down hole

Temperature Rating: 80 Deg C (176 Deg F)

Pressure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 1.07 m (42.12 in)



3-Arm Caliper = 1.78 m (70.27 in)

Available Arm Sizes: 3", 9", and 15"

FTC (Fluid Temperature/Conductivity) = 0.78 m (30.71 in)

1.57" or 40.0 mm Diameter



**Southwest Exploration
Services, LLC**

borehole geophysics & video services

Company	FLORENCE COPPER
Well	R-07
Field	FLORENCE COPPER
County	PINAL
State	ARIZONA

Final

GCFTC Summary

APPENDIX F

Cement Bond Log Summary

WELL R-07

Geophysical Log Summary


Southwest Exploration Services, LLC
 borehole geophysics & video services

 COMPANY: FLORENCE COPPER COMPANY
 FIELD: FLORENCE COPPER SITE
 WELL ID: R-07
 COUNTY: PINAL

STATE: ARIZONA

Logging Engineer: VARIOUS

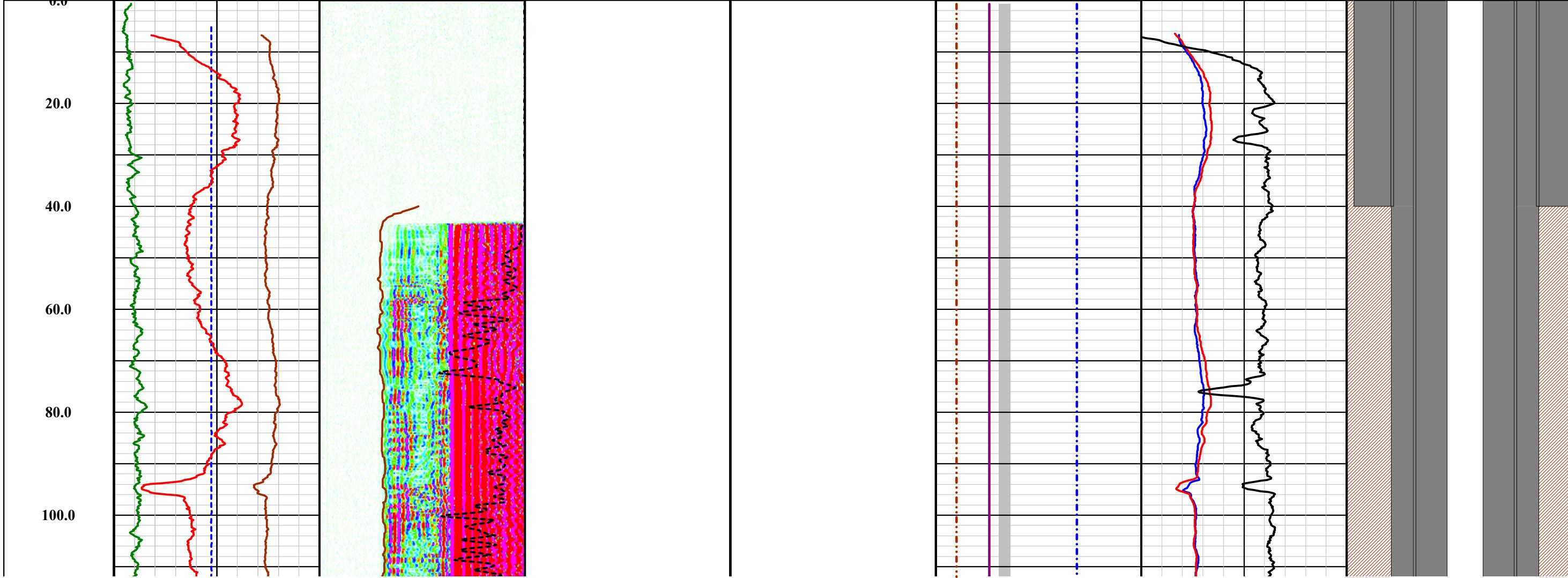
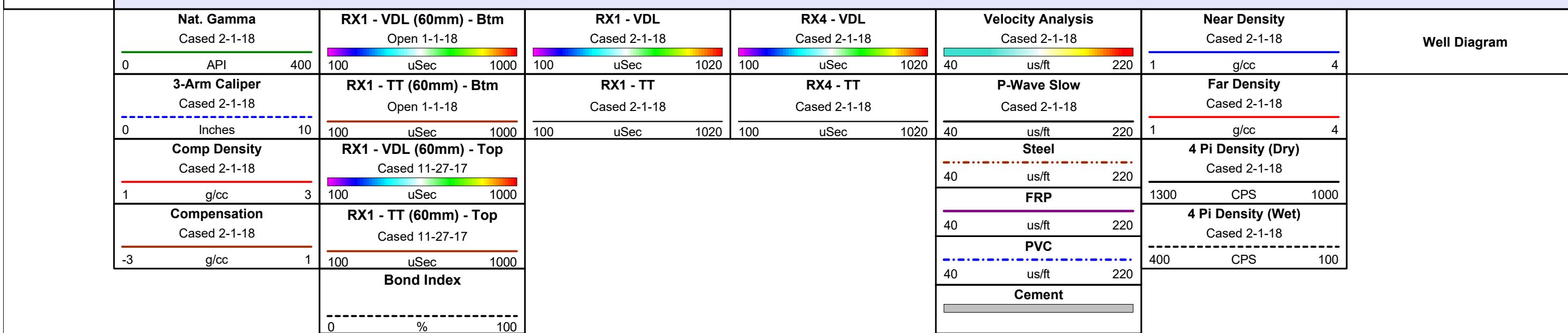
Date Logged: VARIOUS

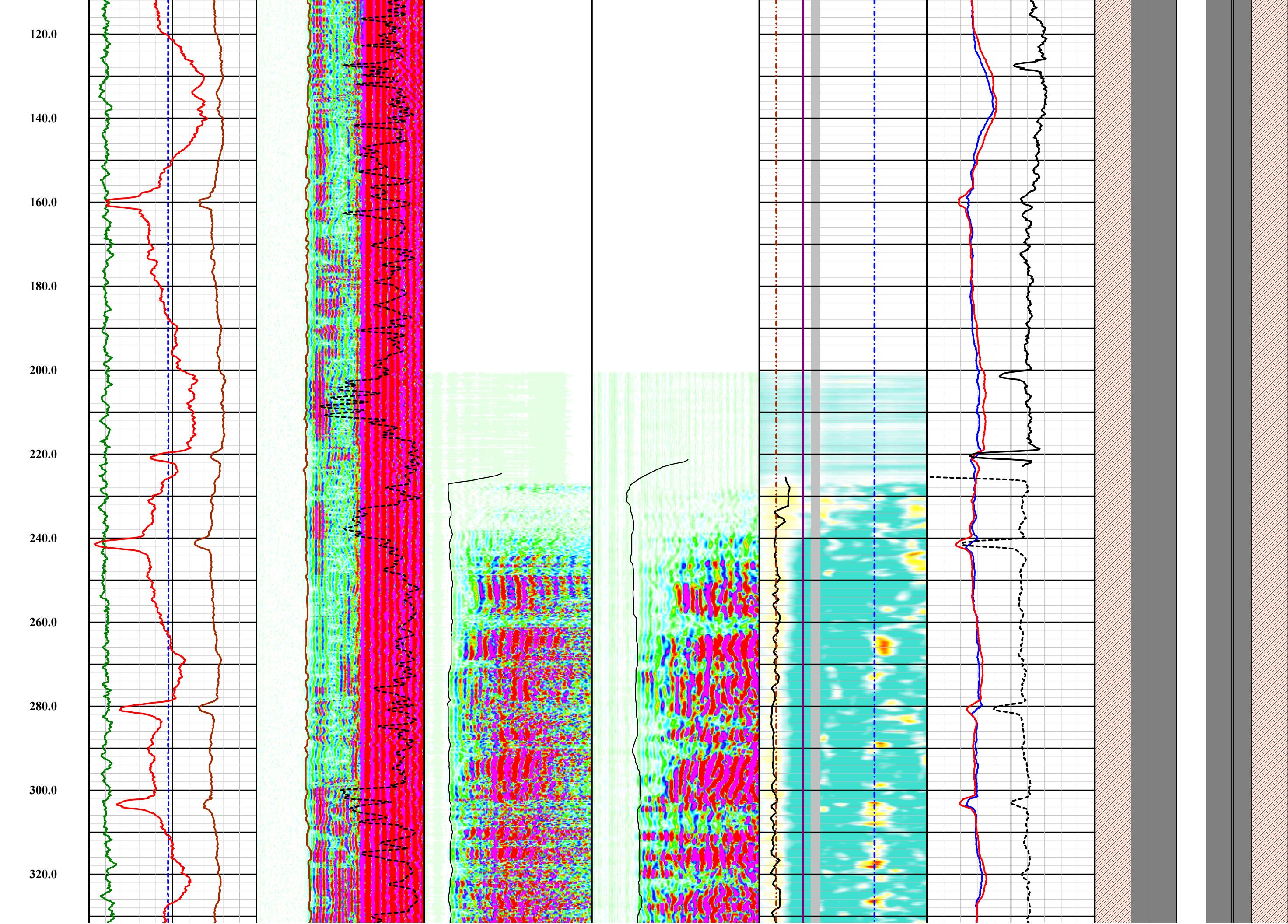
Processed By: K.M / B.C.

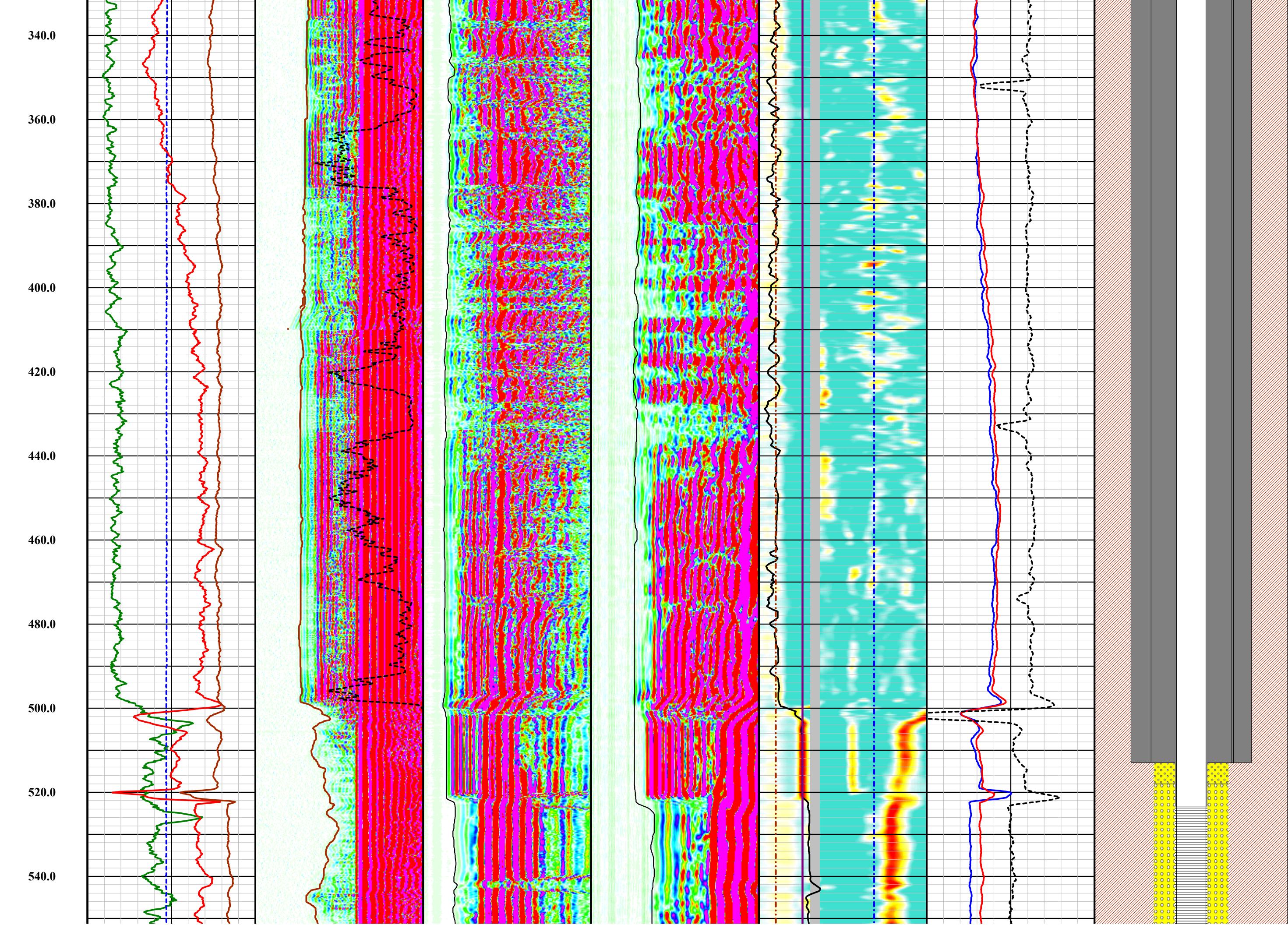
Date Processed: 07-13-18

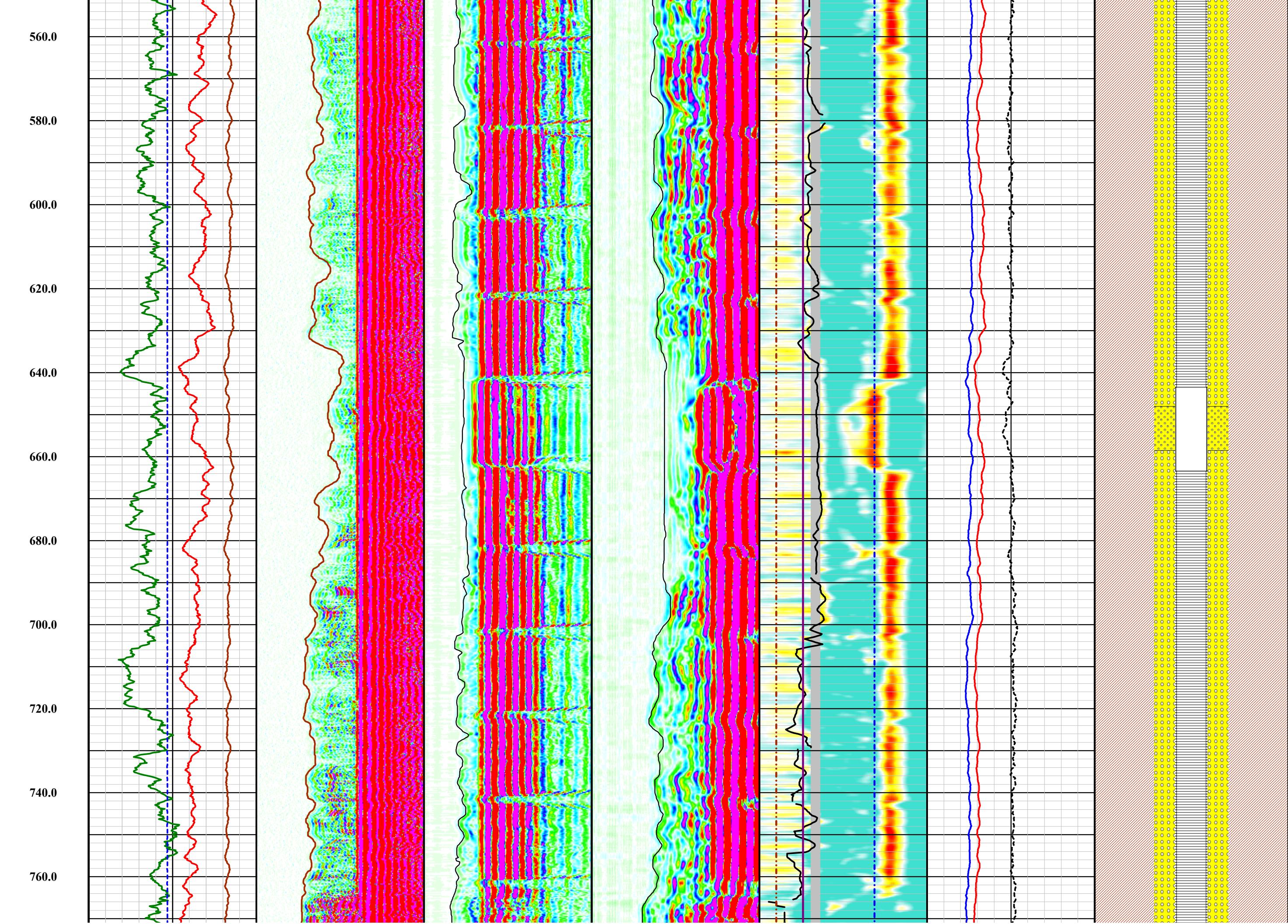

Depth
1in:20ft

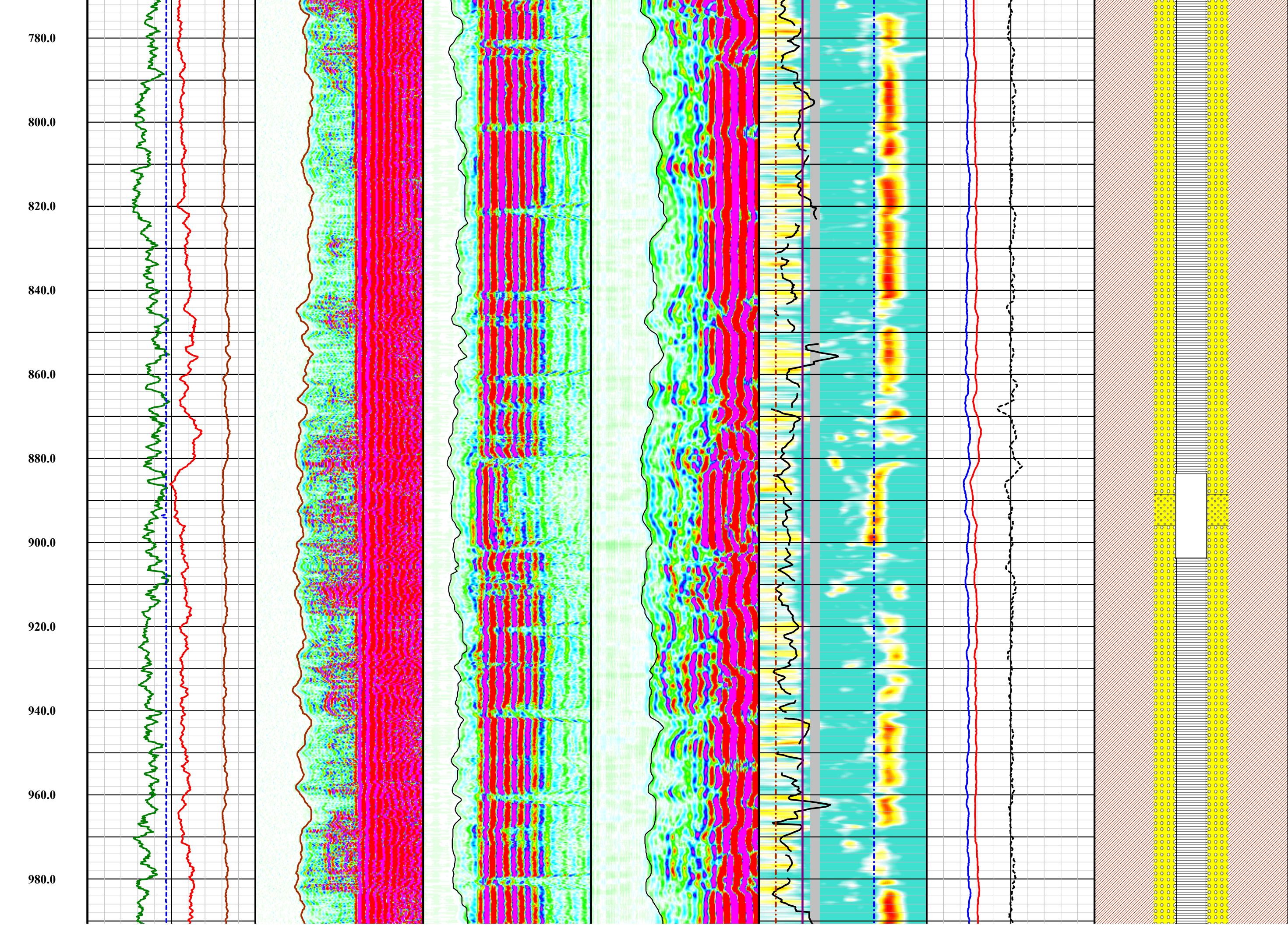
R-07 Sonic CBL with Density Summary

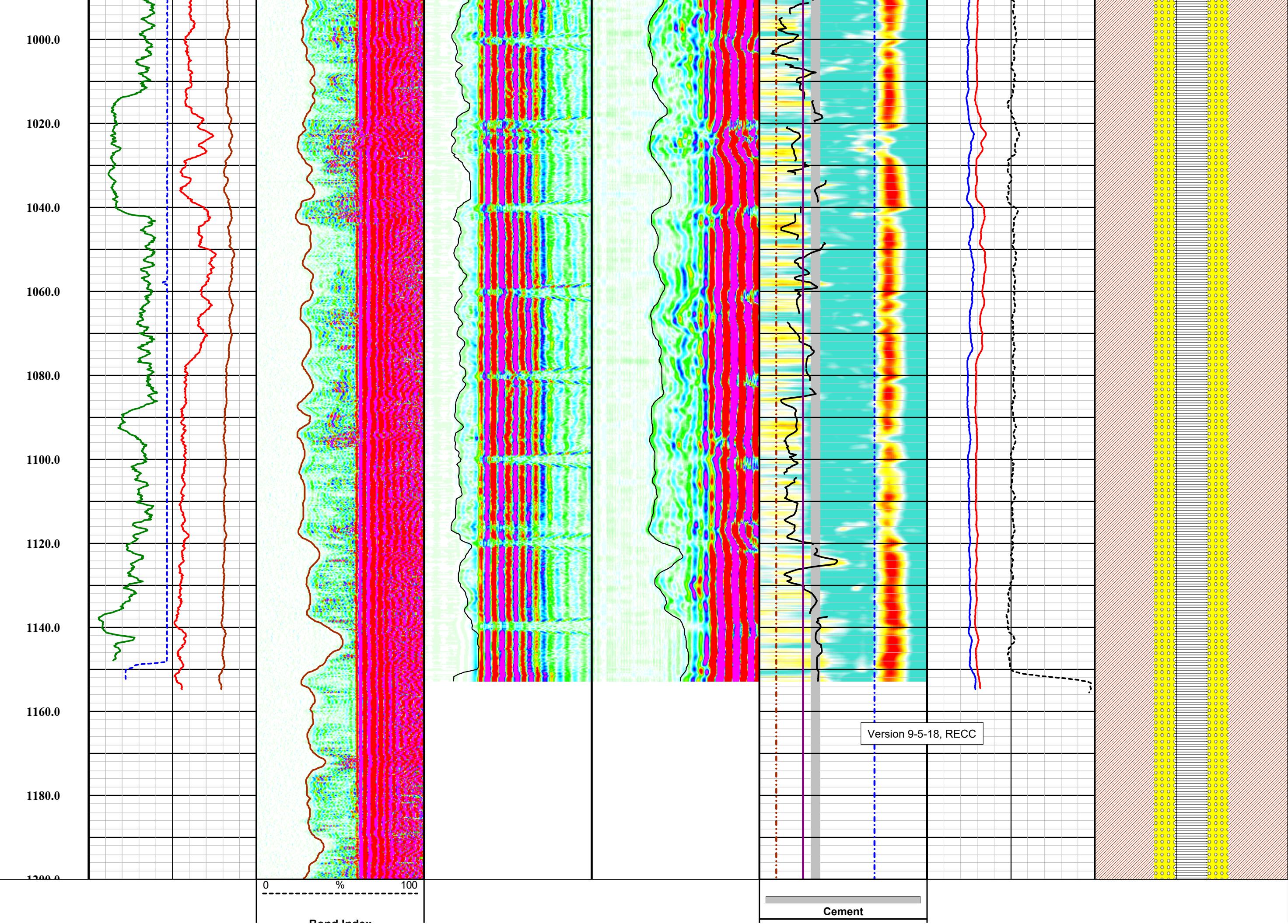


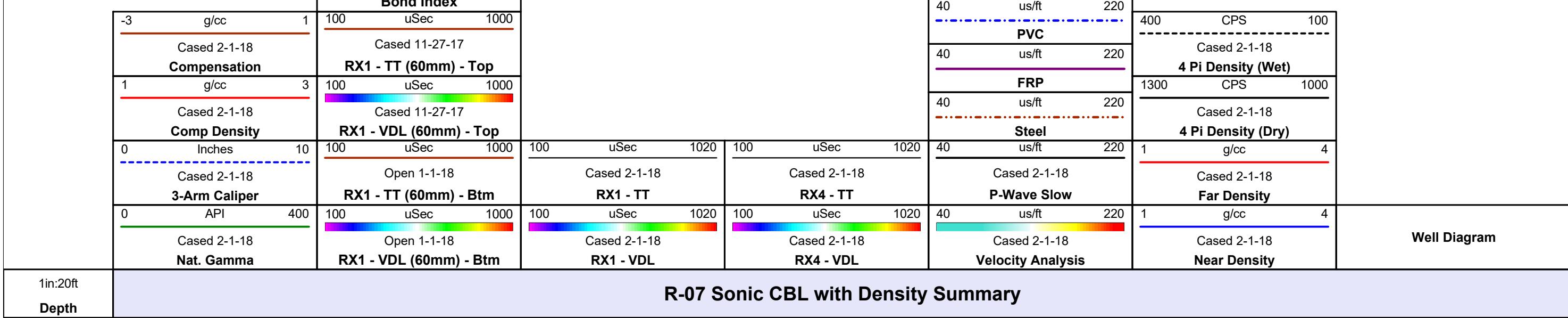












APPENDIX G

SAPT Documentation

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
STANDARD ANNULAR PRESSURE TEST

Operator FLORENCE COPPER, INC

Address 1575 W. HUNT HWY

FLORENCE, AZ 85132

Well Name R-07

LOCATION INFORMATION SE Quarter of the NW Quarter of the SW Quarter of Section 28; Range 9E; Township 4S; County PINAL; Company Representative IAN REAM; Field Inspector LAUREN CANDREVA; Pressure transducer
Type of Pressure Gauge with data logger inch face; 300 psi full scale; 0.001 psi increments;

New Gauge? Yes No If no, date of calibration _____ Calibration certification submitted? Yes No

TEST RESULTS

Readings must be taken at least every 10 minutes for a minimum of 30 minutes for Class II, III and V wells and 60 minutes for Class I wells.

For Class II wells, annulus pressure should be at least 300 psig. For Class I wells, annulus pressure should be the greater of 300 psig or 100 psi above maximum permitted injection pressure.

Original chart recordings must be submitted with this form.

5-year or annual test on time? Yes No
2-year test for TA'd wells on time? Yes No
After rework? Yes No
Newly permitted well? Yes No

Time	<u>Pressure (in psig)</u>	
	Annulus	Tubing
12:30	141.63	same
12:40	143.53	same
12:50	145.42	same
13:00	147.11	same

Casing size 5" - NOMINAL
Tubing size 2"
Packer type INFLATABLE PACKER
Packer set @ 4.57(top), 503.87(bottom)
Top of Permitted Injection Zone 410 feet
Is packer 100 ft or less above top of
Injection Zone ? Yes No
If not, please submit a justification.
Fluid return (gal.) 0.42

Comments: Pressure data collected by Level TROLL 400

Test Pressures: Max. Allowable Pressure Change: Initial test pressure x 0.05 5.48 psi
Test Period Pressure change 7 psi

Test Passed Test Failed

If failed test, well must be shut in, no injection can occur, and USEPA must be contacted within 24 hours. Corrective action needs to occur, the well retested, and written authorization received before injection can recommence.

I certify under penalty of law that this document and all attachments are, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. (See 40 CFR 144.32(d))

Ian Ream

Printed Name of Company Representative

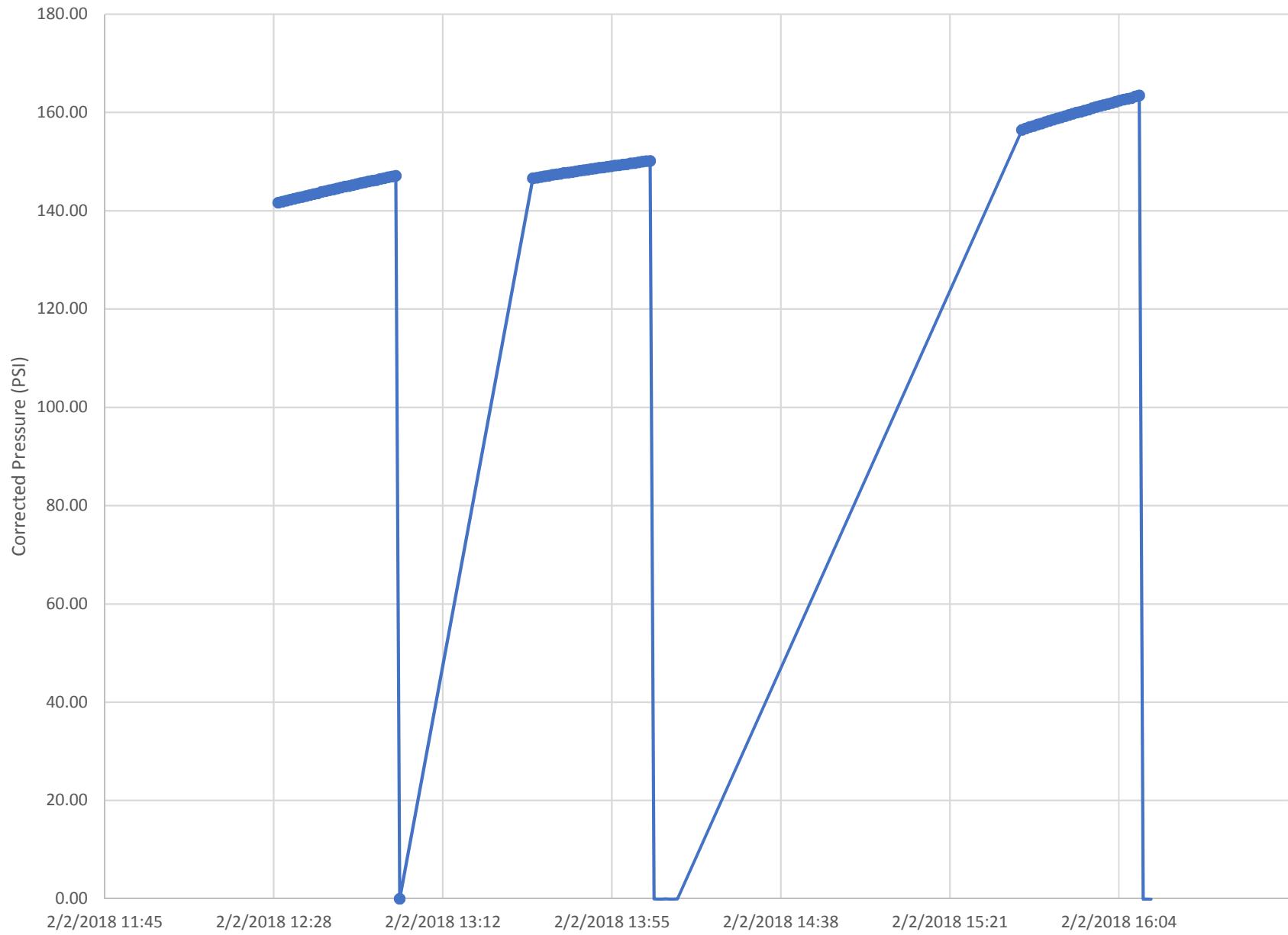
RL

Signature of Company Representative

9-14-2018

Date

R-07 Standard Annular Pressure Test Data



Well R-07 SAPT Data		
Tranducer Serial Number:	554227	
Tranducer Model:	Level TROLL 400 non-vented 300 psi	
Date and Time	Pressure (PSI)	Corrected Presssure (PSI) (Sensor pressure - barometric pressure)
2/2/2018 12:30	155.713	141.63
2/2/2018 12:31	155.938	141.85
2/2/2018 12:32	156.126	142.04
2/2/2018 12:33	156.299	142.21
2/2/2018 12:34	156.531	142.44
2/2/2018 12:35	156.705	142.62
2/2/2018 12:36	156.887	142.80
2/2/2018 12:37	157.05	142.96
2/2/2018 12:38	157.263	143.18
2/2/2018 12:39	157.462	143.37
2/2/2018 12:40	157.616	143.53
2/2/2018 12:41	157.907	143.82
2/2/2018 12:42	158.068	143.98
2/2/2018 12:43	158.269	144.18
2/2/2018 12:44	158.406	144.32
2/2/2018 12:45	158.609	144.52
2/2/2018 12:46	158.794	144.71
2/2/2018 12:47	159	144.91
2/2/2018 12:48	159.117	145.03
2/2/2018 12:49	159.311	145.22
2/2/2018 12:50	159.506	145.42
2/2/2018 12:51	159.694	145.61
2/2/2018 12:52	159.846	145.76
2/2/2018 12:53	160.048	145.96
2/2/2018 12:54	160.205	146.12
2/2/2018 12:55	160.317	146.23
2/2/2018 12:56	160.533	146.45
2/2/2018 12:57	160.712	146.62
2/2/2018 12:58	160.913	146.83
2/2/2018 12:59	161.032	146.94
2/2/2018 13:00	161.201	147.11
2/2/2018 13:01	14.088	0.00
2/2/2018 13:35	160.678	146.59
2/2/2018 13:36	160.815	146.73
2/2/2018 13:37	160.931	146.84
2/2/2018 13:38	161.088	147.00
2/2/2018 13:39	161.191	147.10
2/2/2018 13:40	161.372	147.28
2/2/2018 13:41	161.465	147.38
2/2/2018 13:42	161.577	147.49

Well R-07 SAPT Data		
Tranducer Serial Number:	554227	
Tranducer Model:	Level TROLL 400 non-vented 300 psi	
Date and Time	Pressure (PSI)	Corrected Presssure (PSI) (Sensor pressure - barometric pressure)
2/2/2018 13:43	161.802	147.71
2/2/2018 13:44	161.844	147.76
2/2/2018 13:45	161.928	147.84
2/2/2018 13:46	162.074	147.99
2/2/2018 13:47	162.231	148.14
2/2/2018 13:48	162.316	148.23
2/2/2018 13:49	162.422	148.33
2/2/2018 13:50	162.575	148.49
2/2/2018 13:51	162.705	148.62
2/2/2018 13:52	162.816	148.73
2/2/2018 13:53	162.894	148.81
2/2/2018 13:54	163.013	148.93
2/2/2018 13:55	163.143	149.06
2/2/2018 13:56	163.271	149.18
2/2/2018 13:57	163.322	149.23
2/2/2018 13:58	163.479	149.39
2/2/2018 13:59	163.528	149.44
2/2/2018 14:00	163.705	149.62
2/2/2018 14:01	163.786	149.70
2/2/2018 14:02	163.903	149.82
2/2/2018 14:03	164.06	149.97
2/2/2018 14:04	164.155	150.07
2/2/2018 14:05	164.2	150.11
2/2/2018 14:06	14.083	0.00
2/2/2018 14:07	14.04	-0.05
2/2/2018 14:08	14.037	-0.05
2/2/2018 14:09	14.066	-0.02
2/2/2018 14:10	14.019	-0.07
2/2/2018 14:11	14.033	-0.05
2/2/2018 14:12	14.054	-0.03
2/2/2018 15:40	170.541	156.45
2/2/2018 15:41	170.841	156.75
2/2/2018 15:42	171.125	157.04
2/2/2018 15:43	171.333	157.25
2/2/2018 15:44	171.64	157.55
2/2/2018 15:45	171.84	157.75
2/2/2018 15:46	172.118	158.03
2/2/2018 15:47	172.395	158.31
2/2/2018 15:48	172.63	158.54
2/2/2018 15:49	172.859	158.77

Well R-07 SAPT Data		
Tranducer Serial Number:	554227	
Tranducer Model:	Level TROLL 400 non-vented 300 psi	
Date and Time	Pressure (PSI)	Corrected Presssure (PSI) (Sensor pressure - barometric pressure)
2/2/2018 15:50	173.078	158.99
2/2/2018 15:51	173.324	159.24
2/2/2018 15:52	173.542	159.45
2/2/2018 15:53	173.809	159.72
2/2/2018 15:54	174.058	159.97
2/2/2018 15:55	174.236	160.15
2/2/2018 15:56	174.467	160.38
2/2/2018 15:57	174.681	160.59
2/2/2018 15:58	174.941	160.85
2/2/2018 15:59	175.208	161.12
2/2/2018 16:00	175.424	161.34
2/2/2018 16:01	175.601	161.51
2/2/2018 16:02	175.817	161.73
2/2/2018 16:03	175.99	161.90
2/2/2018 16:04	176.256	162.17
2/2/2018 16:05	176.497	162.41
2/2/2018 16:06	176.694	162.61
2/2/2018 16:07	176.841	162.75
2/2/2018 16:08	177.017	162.93
2/2/2018 16:09	177.337	163.25
2/2/2018 16:10	177.536	163.45
2/2/2018 16:11	14.014	-0.07
2/2/2018 16:12	14.019	-0.07
2/2/2018 16:13	14.007	-0.08

APPENDIX H

Well Development Field Forms

**DEVELOPMENT
FIELD DATA LOG**

Project Name:	Florence Copper	Project No.:	129687-007
Well No.:	2-07	Date:	1/19/18 (Setup) / 1/20/18
Location:	See Plan	Measuring Point:	
Total Depth of Well (ft bbls):	1204	Screen Interval (ft bbls):	340 - 681
Pump Type/Setting (ft bbls):	Airlift	Activity:	Airlift
How Q Measured:	5 gal bucket	H&A Personnel:	P. Bansal

Time	Discharge (gpm)	Pumping Water Level (ft)	Specific Capacity (gpm/ft)	Sand Content (ppm)	pH	Sp. Cond. ($\mu\text{mhos}/\text{cm}$)	Temp. °C	Turbidity NTU	Comments
0750	Pip @ 397 ft	-	-	-	-	-	-	-	Start airlifting
0751	Airline @ 315 ft	-	-	-	-	-	-	-	Stop airlifting
0815	Airline @ 273 ft	-	-	-	-	-	-	-	Start airlifting
0816	-	-	-	-	-	-	-	-	Stop airlifting
0821	Airline @ 252 ft	-	-	-	-	-	-	-	Start airlifting
0824	-	-	-	-	-	-	-	-	Stop air lifting
0900	Airline @ 252 ft pressure @ 165 psi	-	-	-	-	-	-	-	start airlifting
0908	1 gpm	-	-	-	-	-	87.6	4.02	Intermittent flow
0925	1 gpm	-	-	-	-	-	-	58.2	
0940	<1	-	-	0	-	-	-	43.6	
0943	-	-	-	-	-	-	-	-	Stop airlifting
1000	Airline @ 394 ft Pressure @ 160 psi	-	-	-	-	-	-	-	Start airlifting
1001	-	-	-	-	-	-	-	-	Stop airlifting
1120	Depth @ 547 ft	-	-	-	-	-	-	-	
1121	Airline @ 315 ft	-	-	-	-	-	-	-	
1125	Pressure @ 160 psi	-	-	-	-	-	-	-	Start Airlifting
1130	1	-	-	0	-	-	-	OR	dark water
1145	1	-	-	0	-	-	-	194	light brown
1200	1	-	-	0	-	-	-	166	light brown
1230	1	-	-	0	-	-	-	57.9	light & brown
1245	1	-	-	0	-	-	-	39.7	clear
1300	1	-	-	0	-	-	-	34.8	clear
1446	Depth @ 797 ft Airline @ 54 ft Pressure @ 210 psi	-	-	-	-	-	-	-	start airlifting
1451	4.2	-	-	0	-	-	-	275	brown
1505	4.2	-	-	0	-	-	-	96.5	light brown
1521	6	-	-	0	-	-	-	21.7	clear

Comments:

OR = Overrange

**DEVELOPMENT
FIELD DATA LOG**

Project Name:	Florence Copper	Project No.:	129687-007
Well No.:	2-07	Date:	1/19/18 (Setup) / 1/20/18
Location:	See Plan	Measuring Point:	—
Total Depth of Well (ft bbls):	1204	Screen Interval (ft bbls):	340 - 681
Pump Type/Setting (ft bbls):	Airlift	Activity:	Airlift
How Q Measured:	5 gal bucket	H&A Personnel:	R. Bansal

Time	Discharge (gpm)	Pumping Water Level (ft)	Specific Capacity (gpm/ft)	Sand Content (ppm)	pH	Sp. Cond. ($\mu\text{mhos}/\text{cm}$)	Temp. °C	Turbidity NTU	Comments
0750	Pip @ 397 ft	—	—	—	—	—	—	—	Start airlifting
0751	Airline @ 315 ft	—	—	—	—	—	—	—	Stop airlifting
0815	Airline @ 173 ft	—	—	—	—	—	—	—	Start airlifting
0816	—	—	—	—	—	—	—	—	Stop airlifting
0821	Airline @ 252 ft	—	—	—	—	—	—	—	Start airlifting
0822	—	—	—	—	—	—	—	—	Stop airlifting
0900	Airline @ 252 ft Pressure @ 165 psi	—	—	—	—	—	—	—	Start airlifting
0903	1 gpm	—	—	—	—	—	87.6	4.02	Intermittent flow
0925	1 gpm	—	—	—	—	—	—	58.2	
0940	<1	—	—	Ø	—	—	—	43.6	
0943	—	—	—	—	—	—	—	—	Stop airlifting
1000	Airline @ 294 ft Pressure @ 160 psi	—	—	—	—	—	—	—	Start airlifting
1001	—	—	—	—	—	—	—	—	Stop airlifting
1110	—	—	—	—	—	—	—	—	—
1120	Depth @ 547 ft	—	—	—	—	—	—	—	—
1121	Airline @ 315 ft	—	—	—	—	—	—	—	—
1125	Pressure @ 160 psi	—	—	—	—	—	—	—	Start Airlifting
1130	1	—	—	Ø	—	—	—	OP	dark water
1145	1	—	—	Ø	—	—	—	194	light brown
1200	1	—	—	Ø	—	—	—	166	light brown
1230	1	—	—	Ø	—	—	—	57.9	light brown
1245	1	—	—	Ø	—	—	—	39.7	clear
1300	1	—	—	Ø	—	—	—	34.8	clear
1445	Depth @ 747 ft Airline @ 540 ft Pressure @ 210 psi	—	—	—	—	—	—	—	Start airlifting
1451	4.2	—	—	Ø	—	—	—	27.5	brown
1505	4.2	—	—	Ø	—	—	—	94.5	light brown
1521	Ø	—	—	Ø	—	—	—	21.7	clear

Comments:

OP = Overrange

**DEVELOPMENT
FIELD DATA LOG**

Project Name:	Florence (OPDOR)	Project No.:	129687-007
Well No.:	R-07	Date:	1/20/18 - 1/21/18
Location:	SPR P1(1)	Measuring Point:	-
Total Depth of Well (ft bbls):	1204	Screen Interval (ft bbls):	340-681
Pump Type/Setting (ft bbls):	Airlift	Activity:	Airlift
How Q Measured:	5 gal bucket	H&A Personnel:	R. Barkai

Time	Discharge (gpm)	Pumping Water Level (ft)	Specific Capacity (gpm/ft)	Sand Content (ppm)	pH	Sp. Cond. ($\mu\text{mhos/cm}$)	Temp. °C	Turbidity NTU	Comments
1/20/18									
1535	6	-	-	0	-	-	-	13.8	clear
1550	6	-	-	0	-	-	-	7.51	clear
1605	6	-	-	0	-	-	-	4.65	clear
1605	-	-	-	-	-	-	-	-	stopped pumping
1/21/18									
Depth @ 997 ft	Airlift @ 546 ft	Pressure @ 210 psi							
0722	-	-	-	-	-	-	-	-	Start airlifting
0725	~2	-	-	0	-	-	-	27.1	cloudy/light brown
0740	6	-	-	0	-	-	-	47.0	light brown
0815	6	-	-	0	-	-	-	16.7	clear
0830	6	-	-	0	-	-	-	8.28	clear
0845	6	-	-	0	-	-	-	7.35	clear
0847	-	-	-	-	-	-	-	-	stopped pumping
1035	-	-	-	-	-	-	-	-	start airlifting
1040	12	-	-	0	-	-	-	92.6	clear
1055	12	-	-	0	-	-	-	46.4	clear
1100	12	-	-	0	-	-	-	21.6	clear
1125	12	-	-	0	-	-	-	17.7	clear
1140	12	-	-	0	-	-	-	18.1	clear
1150	12	-	-	0	-	-	-	15.4	clear
1200	12	-	-	0	-	-	-	11.2	clear
1201	-	-	-	-	-	-	-	-	stopped airlifting
1158	Depth @ 400 ft	Airtite @ 252 ft	Pressure @ 170 psi	-	-	-	-	-	Start airlifting
1205	-	-	-	-	-	-	-	DR	dark, thick water
1215	-	-	-	-	-	-	-	-	Stop airlifting
Comments:									

$$\frac{4\text{in} \times 1\text{ft}}{12\text{in}}$$

$$2532\text{gal} = 33\text{ gal}$$

$$\text{bleach}$$

$$970\text{ft} \times \pi \times \left(\frac{4\text{in}}{12}\right)^2 = 339\text{ft}^3 \times \frac{7.48}{1\text{ft}^3}$$

**HALEY
ALDRICH**

**DEVELOPMENT
FIELD DATA LOG**

Project Name:	Florence Copper	Project No.:	129687-007
Well No.:	R-07	Date:	1/22/18 - 1/23/18
Location:	Spec Plan	Measuring Point:	-
Total Depth of Well (ft bbls):	1204	Screen Interval (ft bbls):	340-681
Pump Type/Setting (ft bbls):	Airlift	Activity:	Airlift
How Q Measured:	Total Free Chlorine(mg/L) Chlorine(mg/L)	H&A Personnel:	R. Bansal

Time	Discharge (gpm)	Pumping Water Level (ft)	Specific Capacity (gpm/ft)	Sand Content (ppm)	pH	Sp. Cond. (umhos/cm) MS/cm	Temp. °C	Turbidity NTU	Comments
12218									
1220	Depth @ 400ft	Airline @ 244ft	Pressure @ 170 psi	-	-	-	-	-	start air lifting
1235	-	-	-	-	-	-	-	-	stop air lifting
1358	Do pth @ 600ft	Airline @ 315ft	Pressure @ 190 psi	-	-	-	-	-	start air lifting
1405	-	1.75	2.39	-	8.65	45014	23.7	OR	dark/muddy
1420	-	-	-	-	-	-	-	-	stop air lifting
1530	Depth @ 600ft	Airline @ 315ft	Pressure @ 190psi	-	-	-	-	-	start air lifting
1540	-	1.05	1.16	8.77	4895	21.9	907	-	brown 1.5/45020 and corner
1620	-	-	2.03	5/200	5.99	2188	20.6	425	brown/sandy
1705	-	0.74	0.71	15/400	7.81	1766	21.6	497	brown/sandy
1735	-	0.00	0.00	0.5/375	8.30	1222	19.5	231	brown/cloudy
1800	-	-	-	15/375	6.40	1473	17.5	157	clear
1805	-	-	-	-	-	-	-	-	stop air lifting
12216	Depth @ 600ft	Airline @ 315ft	Pressure @ 190psi	-	-	-	-	-	start air lifting
720	-	-	0	8.21	1398	6.4	463	-	brown/no visible sediment
730	-	-	0	8.30	130	15.0	258	-	clear
740	-	-	-	-	-	-	-	-	stopped air lifting
0933	Depth @ 797ft	Airline @ 546ft	Pressure @ 200psi	-	-	-	-	-	start air lifting
0935	-	0.00	0.00	0	8.33	747	20.3	257	light brown/cloudy
1005	-	0.11	0.11	0	8.15	743	21.7	22.6	clear
1020	-	0.09	0.07	0	8.27	911	21.0	11.5	clear
1035	-	0.01	0.01	0	8.01	1395	21.1	9.77	-
1045	-	-	-	-	-	-	-	-	stopped air lifting
1215	Depth @ 997ft	Airline @ 546ft	pressure @ 210 ps	-	-	-	-	-	start air lifting
1220	-	0.14	0.11	0.1	8.13	1745	21.5	545	brown/murky
1235	-	0.03	0.02	0	7.94	1446	22.2	17.8	clear
1250	-	0.12	0.12	0	7.92	1401	23.3	27.7	clear

Comments:

**DEVELOPMENT
FIELD DATA LOG**

Project Name: Florence Copper	Project No.: 124687-007
Well No.: P-07	Date: 7/23/18 - 7/25/18
Location: See Plan	Measuring Point: —
Total Depth of Well (ft bbls): 1204	Screen Interval (ft bbls): 340 - 683
Pump Type/Setting (ft bbls): Airlift	Activity: Airlift
How Q Measured:	H&A Personnel: P. Bansal

Time	Discharge (gpm)	Pumping Water Level (ft)	Total Cl (mg/l)	Specific Capacity (gpm/ft)	Sand Content (ppm)	pH	Sp. Cond. ($\mu\text{hos/cm}$)	Temp. °C	Turbidity NTU	Comments
123/18										
1305	—	0.06	0.04	0	7.90	1393	23.2	14.1	clear	
1320	—	—	—	0	7.90	1383	23.7	9.55	clear	
1325	—	—	—	—	—	—	—	—	stopped airlifting	
1500	Depth @ 1157 ft	Airline @ 54 ft	Pressure @ 200 psi	—	—	—	—	—	—	start airlifting
1505	—	0.01	0.04	<0.1	7.81	1492	23.7	15.7	cloudy/light brown	
1520	—	—	—	0.1	7.80	1430	23.6	21.8	clear	
1535	—	—	—	0	7.96	1390	24.2	19.3		
1550	—	—	—	0	7.95	1387	24.3	16.9	clear	
1605	—	0.04	0.01	0	8.00	1379	24.0	13.4	clear	
1612	—	—	—	—	—	—	—	—	stopped airlifting	
124/18			Tag bottom at	1208 ft bdc.						
125/18										
Surge #1	1105	228.3	2799.86	—	—	—	—	—	static depth @	1176 ft
	1120	—	278—	—	—	—	—	—	pump on	
	1122	72	2741.50	7.02	1488	25.6	73.7	cloudy		
	1135	71	2770.70	7.29	1857	26.6	14.2	cloudy		
	1150	71	2780.90	7.38	1784	25.5	41.4	cloudy		
	1155	—	2784.40	—	—	—	—	—	pump off V = 2290 gal	
Surge #2	1213	230.25	—	—	—	—	—	—	started pumping	
	1215	71	2784.70	7.50	1747	25.3	15.9	cloudy		
	1230	71	2795.60	7.52	1679	25.9	2.25	clear		
	1245	69	2804.48	7.55	1645	25.8	1.84	clear		
	1251	—	2810.2	—	—	—	—	—	stopped pumping V = 2512 gal	
	1269	—	231.50	—	—	—	—	—	pump on	
Surge #3	1310	71	2810.70	7.54	1662	25.7	8.73	clear		
	1325	68	2821.30	7.58	1609	26.0	2.50	clear		
	1340	70	2831.80	7.50	1618	25.8	2.96	clear		
	1346	—	2835.61	—	—	—	—	—	pump off V = 2479 gal	

Comments:

**PUMPING TEST/DEVELOPMENT
FIELD DATA LOG**

Project Name: Florence Copper	Project No.: 129687-007
Well No.: D-07	Date: 7/25/16 - 7/26/16
Location: SEE PLAN	Measuring Point: TOC
Total Depth of Well (ft bbls): 1208	Screen Interval (ft bbls): 340 - 681
Pump Setting (ft bbls): Grundfos 3 phase	Pump Type: Surge
How Q Measured: totalizer & stopwatch	Personnel: R. Bansal

TOTAL liter(gal)								
Time	Discharge (gpm)	Pumping Water Level (ft)	Specific Capacity (gpm/ft)	Sand Content (ml/L)	pH	Sp. Cond. (mmhos/cm) µS/cm	Temp. °F °C	Comments
116 14	1402	—	232.5	—	—	—	—	
	1405	—	—	—	—	—	—	Pump on
	1406	68	—	283640	7.63	1638	25.4	5.99 NTU
	1420	68	—	284760	7.63	1625	25.5	1.94 NTU
	1440	69	246.0	285950	7.62	1610	25.6	1.43 NTU
	1445	—	286295	—	—	—	—	Pump off V = 2834 gal
	1505	—	233.4	—	—	—	—	Pump on
e 1506	69	—	286350	7.61	1615	4.13	4.13 NTU	
1520	69	—	287410	7.68	1606	25.7	1.21 NTU	
	1535	70	246.45	288370	7.64	1613	25.7	1.60 NTU
	1540	—	289692	—	—	—	—	Pump off V = 2897 gal
	//Depth of pump intake @ 916 ft							
	1642	—	223.6	288900	—	—	—	Pump on
	1645	70	—	288950	7.75	1606	24.9	12.8 NTU
	1700	71	—	290000	7.76	1610	25.0	7.10 NTU
	1715	70	—	291050	7.74	1521	25.1	0.33 NTU
	1723	—	233.0	240.5	—	—	—	Pump off V = 2630 gal
	1738	—	232.79	291580	—	—	—	Pump on
	1740	71	—	291670	—	—	—	
	1803	—	242.02	293340	8.07	929	21.8	Pump off 4.70 NTU
116	0705	70	230.0	293340	6.58	1529	19.3	Pump off 96.1 NTU
	0720	71	—	294570	6.85	1361	23.6	6.13 NTU
	0735	70	—	2945440	7.11	1435	23.7	2.72 NTU
	0739	—	242.0	295752	—	—	—	Pump off V = 2412 gal
	0802	—	231.5	—	—	—	—	Pump on
K	0805	71	—	295920	7.52	1366	23.3	7.08 NTU
	0820	72	—	296900	7.51	1583	24.3	2.03 NTU
	0935	72	243.1	298322	—	—	—	1.81 NTU 0.839 pump off V = 2570 gal

Additional Comments:

PUMPING TEST/DEVELOPMENT FIELD DATA LOG

Project Name: FLORENCE COPPER	Project No.: 129487-007
Well No.: D-07	Date: 426118
Location: SEE PLAN	Measuring Point: TOC
Total Depth of Well (ft bbls): 1208	Screen Interval (ft bbls): 340 - 681
Pump Setting (ft bbls): Cimundios 3 phase	Pump Type: Surge
How Q Measured: Totalizer & stop switch	Personnel: P. Bansal

Totalizer (gal)

Time	Discharge (gpm)	Pumping Water Level (ft)	Specific Capacity (gpm/ft)	Sand Content (ml/L)	pH	Sp. Cond. (mmhos/cm) (us/cm)	Temp. °F °C	Comments
0908	70	232.5	2983	22	7.61	1561	23.8	13.3 NTU pump on
0923	71	—	2993	70	7.58	1554	24.9	1.69 NTU
0938	70	—	3005	30	7.60	1571	24.8	0.64 NTU
0944	—	241.45	3008	79	—	—	—	pump off V = 2556 gal
1001	71	232.42	3008	78	7.60	1571	24.7	4.64 NTU pump on
1015	71	—	3010	20	7.65	1562	25.2	1.53 NTU
1031	71	244.26	3030	13	7.71	1576	24.1	0.98 NTU pump off
1046	70	232.60	3030	13	7.67	1541	24.6	4.48 NTU pump on
1100	71	—	3039	00	7.64	1505	25.1	1.34 NTU
1118	71	244.30	3051	94	7.68	1520	24.7	0.65 NTU pump off
Depth of pump intake @ 607 ft bbls TOC								
1232	72	233.30	3052	00	7.74	1442	24.2	16.1 NTU pump on
1245	72	—	3063	00	7.64	1513	25.2	10.8 NTU
1300	72	243.00	3073	05	7.65	1535	25.3	6.32 NTU pump off
1305	72	234.00	3073	05	7.67	1350	25.2	5.69 NTU pump on
1330	71	—	3086	30	7.70	1470	25.3	3.30 NTU
1347	71	243.75	3096	34	7.68	1574	25.4	1.52 NTU pump off
1400	72	234.95	3096	34	7.71	1602	24.8	3.15 NTU pump on
1415	72	—	3108	30	7.69	1537	25.5	1.44 NTU
1430	72	244.45	3118	04	7.77	1555	24.6	0.78 NTU pump off
1447	73	235.43	3118	04	7.86	1610	24.6	3.88 NTU pump on
1500	72	—	3128	50	7.74	1545	25.3	0.89 NTU
1515	72	244.40	3138	31	7.76	1592	24.9	0.72 NTU pump off
Completed well Development								
Tagged bottom @ 1208 ft bbls TOC								

APPENDIX I

Well Video Log and Gyroscopic Survey Reports



Southwest Exploration Services, LLC

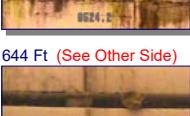
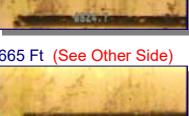
borehole geophysics & video services

Southwest Exploration Services, LLC

25811 S. Arizona Avenue Chandler, AZ. 85248

Phone: (480) 926-4558 Fax: (480) 926-4579 Web: www.swexp.com

Client:	Florence Copper			Survey Date:	February 07, 2018		
Address:	1575 W. Hunt Hwy			Invoice:	Run:	1	
City:	Florence	State:	AZ	Zip:	85132	Well Name:	R-07
Requested By:	Florence Copper			P.O.:	Well Owner: Florence Copper		
Copy To:				Camera:			
Purpose:	General Inspection			Zero Datum:	Top of Casing		
Location:				Depth:	Vehicle: 750		
Field:	FLORENCE COPPER			Type Perfs:	Horizontal Slots		
1st Csg.O.D.	5 In.	Csg Weight:		From:	0 ft.	To:	1160 ft.
2nd Csg.O.D.		Csg Weight:		From:		To:	
Standing Water Level:	226.8 ft.	Pumping Water Level:		Pump Depth:		O.D.Ref.:	Measured
Operator:	M. Quinones	Lat.:		Long.:		Sec:	
Twp:		Rge:					

Other Information: Wellbore Snapshots		True Depths: (SideScan-Feet)	WELLBORE / CASING INFORMATION
0 Ft (See Other Side)	29.5 Ft (See Other Side)	0	Start of Video Survey
		29.5	Side Scan of Casing Joint
226.8 Ft (See Other Side)	523.8 Ft (See Other Side)	226.8	Static Water Level
		523.8	Bottom of Fiber Glass Casing
522.4 Ft (See Other Side)	524.2 Ft (See Other Side)	524.2	Top of PVC Casing
		524.7	Top of 1st Set of Perforations Open and Clean
644 Ft (See Other Side)	665 Ft (See Other Side)	644	Bottom of 1st Set of Perforations
		665	Top of 2nd Set of Perforations Open and Clean
884.1 Ft (See Other Side)	905.1 Ft (See Other Side)	884.1	Bottom of 2nd Set of Perforations
		905.1	Top of 3rd Set of Perforations Open and Clean
1155.5 Ft (See Other Side)	1156.2 Ft (See Other Side)	1,155.5	Down Hole View of Bottom Fill of Well Gravel Pack and Silty Sand
		1,156.2	End of Video Survey
884.1 Ft (See Other Side)	905.1 Ft (See Other Side)		
1155.5 Ft (See Other Side)	1156.2 Ft (See Other Side)		

Notes:

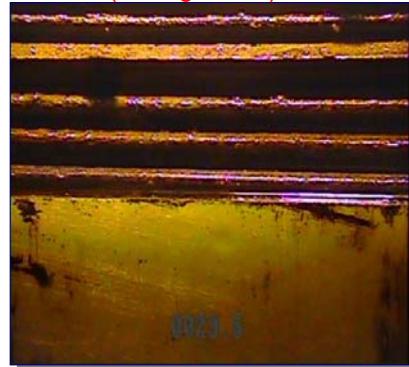
Page Number: 1

12 WELLBORE SHAPSHOTS

0 Ft (Enlargement)



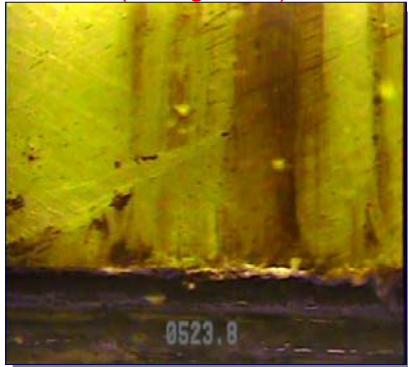
29.5 Ft (Enlargement)



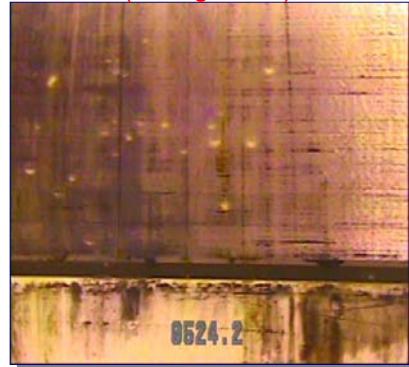
226.8 Ft (Enlargement)



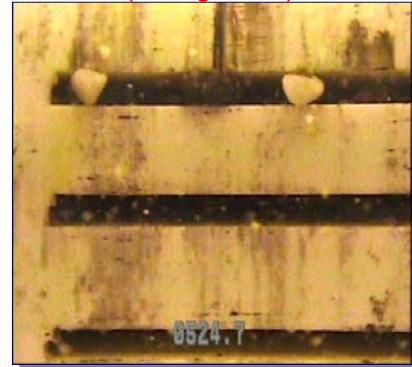
523.8 Ft (Enlargement)



524.2 Ft (Enlargement)



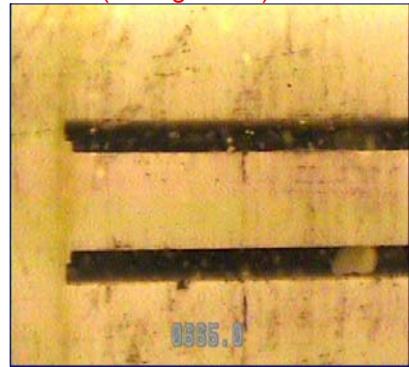
524.7 Ft (Enlargement)



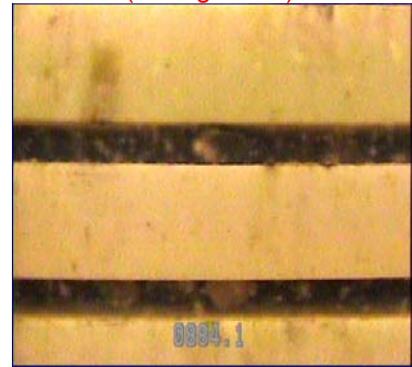
644 Ft (Enlargement)



665 Ft (Enlargement)



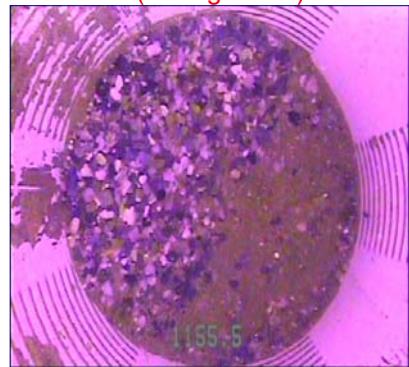
884.1 Ft (Enlargement)



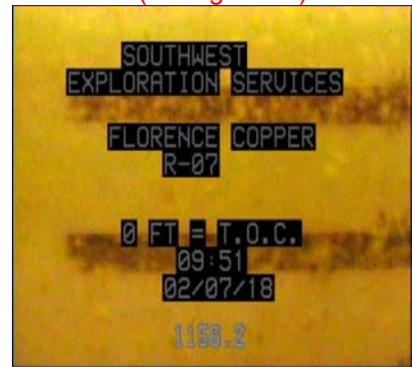
905.1 Ft (Enlargement)



1155.5 Ft (Enlargement)



1156.2 Ft (Enlargement)



Drift Report

Wellbore DRIFT Interpretation

PREPARED ESPECIALLY FOR
FLORENCE COPPER

R-07

Wednesday - February 7, 2018

This Wellbore Interpretation Package represents our best efforts to provide a correct interpretation. Nevertheless, since all interpretations are opinions based on inferences from electrical or other types of measurements, we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by Customer resulting from any interpretation made by this document. We do not warrant or guarantee the accuracy of the data, specifically including (but without limitations) the accuracy of data transmitted by electronic process, and we will not be responsible for accidental or intentional interception of such data by third parties. Our employees are not empowered to change or otherwise modify the attached interpretation. Furthermore, along with Eagle Pro Software we do not warrant or guarantee the accuracy of the programming techniques employed to produce this document. By accepting this Interpretation Package, the Customer agrees to the foregoing, and to our General Terms and Conditions.



Southwest Exploration Services, LLC
(480) 926-4558

WELLBORE DRIFT INTERPRETATION

Southwest Exploration Services, LLC

(480) 926-4558

Company:	FLORENCE COPPER		Well Owner:	
County:	PINAL	State:	Arizona	Country:
Well Number:	R-07	Survey Date:	Wednesday - February 7, 2018	Magnetic Declination:
Field:	FLORENCE COPPER		Drift Calculation Methodology:	Balanced Tangential Method
Location:				
Remarks:				
Witness:	H & A	Vehicle No.:	750	Invoice No.:
Tool:	Gyro - 186		Lat.:	Long.:
			Sec.:	Twp.:
				Rge.:

MEASURED DATA			DATA COMPUTATIONS						
DEPTHs, feet	INCLINATIONS, degrees	AZIMUTHs, degrees	TVD, feet	T. LATITUDE, feet	T. LONGITUDE, feet	DOGLEg SEV., degrees per 20 Feet	DOGLEg SEV., degrees per 100 feet	DRIFT DIST., feet	DRIFT BGR., degrees
0	0.00	000.00	0.00						
20	0.42	179.24	19.99	-0.073	0.001	1.00	14.79	0.07' (.84")	179.20
40	0.37	179.79	39.98	-0.211	0.002	0.41	0.07	0.21' (2.52")	179.40
60	0.35	182.97	59.97	-0.337	-0.001	0.96	0.41	0.34' (4.08")	180.20
80	0.26	167.00	79.96	-0.442	0.006	0.84	2.05	0.44' (5.28")	179.20
100	0.20	161.34	99.96	-0.519	0.027	0.42	0.73	0.52' (6.24")	177.00
120	0.08	180.84	119.95	-0.566	0.038	0.13	2.50	0.57' (6.84")	176.20
140	0.06	139.91	139.94	-0.588	0.045	0.43	5.17	0.59' (7.08")	175.70
160	0.06	346.83	159.93	-0.586	0.049	0.83	14.39	0.59' (7.08")	175.20
180	0.20	313.33	179.92	-0.552	0.021	0.95	4.26	0.55' (6.60")	177.80
200	0.16	348.22	199.91	-0.501	-0.010	0.37	4.43	0.50' (6.00")	181.20
220	0.20	343.29	219.90	-0.440	-0.026	1.00	0.64	0.44' (5.28")	183.30
240	0.26	328.71	239.89	-0.368	-0.060	1.00	1.88	0.37' (4.44")	189.20
260	0.23	009.46	259.88	-0.290	-0.077	0.34	5.15	0.30' (3.60")	194.90
280	0.25	046.40	279.87	-0.220	-0.039	0.93	4.69	0.22' (2.64")	190.00
300	0.25	067.53	299.86	-0.173	0.033	0.78	2.71	0.18' (2.16")	169.20
320	0.25	084.92	319.85	-0.152	0.117	0.53	2.24	0.19' (2.28")	142.50
340	0.25	082.31	339.84	-0.142	0.204	0.00	0.34	0.25' (3.00")	124.90

Page No. 1 True Vertical Depth: 1159.43' **Final Drift Distance: 8.91' (106.92")** **Final Drift Bearing: 143.70°**

Note: Magnetic Declination is not used because it is not a factor in the calculation of well drift or alignment. Magnetic Declination is only important if attempting to hit a target or miss another well and then it is included in the calculations.

WELLBORE DRIFT INTERPRETATION

Southwest Exploration Services, LLC

(480) 926-4558

R-07

MEASURED DATA			DATA COMPUTATIONS						
DEPTHs, feet	INCLINATIONS, degrees	AZIMUTHs, degrees	TVD, feet	T. LATITUDE, feet	T. LONGITUDE, feet	DOGLEG SEV., degrees per 20 Feet	DOGLEG SEV., degrees per 100 feet	DRIFT DIST., feet	DRIFT BRG., degrees
360	0.26°	079.83°	359.83	-0.128	0.292	0.56	0.32	0.32' (3.84")	113.70
380	0.28°	074.70°	379.82	-0.107	0.384	0.73	0.66	0.40' (4.80")	105.60
400	0.29°	062.65°	399.81	-0.071	0.476	0.88	1.55	0.48' (5.76")	098.50
420	0.29°	062.08°	419.80	-0.024	0.566	0.20	0.07	0.57' (6.84")	092.40
440	0.30°	059.85°	439.79	0.026	0.656	0.97	0.29	0.66' (7.92")	087.70
460	0.30°	054.84°	459.78	0.082	0.744	0.96	0.65	0.75' (9.00")	083.70
480	0.32°	051.40°	479.77	0.147	0.830	0.12	0.44	0.84' (10.08")	080.00
500	0.31°	030.85°	499.76	0.228	0.901	0.81	2.64	0.93' (11.16")	075.80
520	0.29°	001.97°	519.75	0.325	0.930	0.59	3.69	0.99' (11.88")	070.70
540	0.21°	327.39°	539.74	0.406	0.912	0.73	4.40	1.00' (12.00")	066.00
560	0.18°	100.92°	559.73	0.431	0.923	0.28	13.59	1.02' (12.24")	065.00
580	0.31°	081.22°	579.72	0.433	1.007	0.77	2.53	1.10' (13.20")	066.70
600	0.34°	052.74°	599.71	0.477	1.108	0.49	3.64	1.21' (14.52")	066.70
620	0.31°	021.94°	619.70	0.563	1.175	0.69	3.93	1.30' (15.60")	064.40
640	0.27°	356.10°	639.69	0.660	1.192	0.13	3.31	1.36' (16.32")	061.00
660	0.14°	350.08°	659.68	0.731	1.185	0.83	0.78	1.39' (16.68")	058.30
680	0.04°	039.18°	679.67	0.760	1.185	0.80	6.15	1.41' (16.92")	057.30
700	0.39°	118.64°	699.66	0.733	1.249	0.25	9.45	1.45' (17.40")	059.60
720	0.44°	133.77°	719.65	0.647	1.364	0.54	1.95	1.51' (18.12")	064.60
740	0.55°	153.70°	739.64	0.508	1.462	0.24	2.56	1.55' (18.60")	070.80
760	0.67°	166.43°	759.63	0.308	1.532	0.94	1.64	1.56' (18.72")	078.60
780	0.85°	167.24°	779.62	0.050	1.592	0.65	0.11	1.59' (19.08")	088.20
800	0.89°	159.99°	799.61	-0.241	1.678	0.97	0.94	1.70' (20.40")	098.20
820	1.00°	167.96°	819.60	-0.558	1.768	0.06	1.03	1.85' (22.20")	107.50
840	1.13°	162.96°	839.59	-0.917	1.862	0.29	0.65	2.08' (24.96")	116.20
860	1.20°	159.63°	859.58	-1.302	1.993	0.57	0.43	2.38' (28.56")	123.20
880	1.22°	171.38°	879.57	-1.709	2.098	0.47	1.51	2.71' (32.52")	129.20
900	1.00°	154.13°	899.56	-2.077	2.206	0.42	2.22	3.03' (36.36")	133.30
920	1.28°	161.62°	919.55	-2.446	2.353	0.69	0.97	3.39' (40.68")	136.10
940	1.36°	152.09°	939.54	-2.868	2.535	0.04	1.23	3.83' (45.96")	138.50
960	1.24°	156.51°	959.53	-3.276	2.732	0.30	0.57	4.27' (51.24")	140.20
980	1.34°	142.69°	979.52	-3.660	2.960	0.98	1.78	4.71' (56.52")	141.00
1,000	1.49°	150.02°	999.51	-4.071	3.232	0.96	0.95	5.20' (62.40")	141.60

WELLBORE DRIFT INTERPRETATION

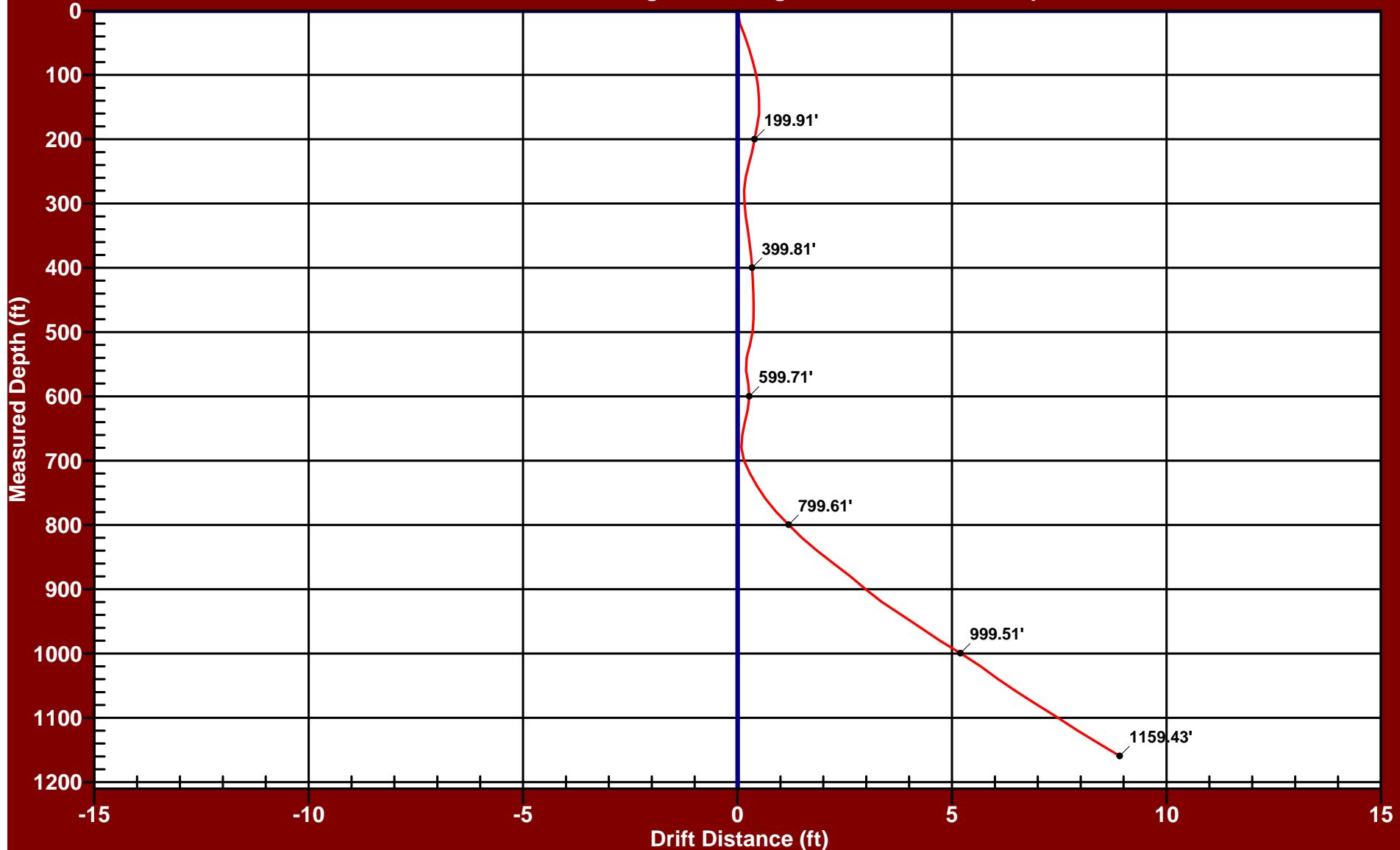
Southwest Exploration Services, LLC
(480) 926-4558

R-07

PLANE OF DRIFT VIEW - R-07

FLORENCE COPPER

Drift Distance = 8.91 Feet Drift Bearing = 143.7 Degrees True Vertical Depth = 1159.43 Feet



Date of Survey: Wednesday - February 7, 2018

Balanced Tangential Calculation Method

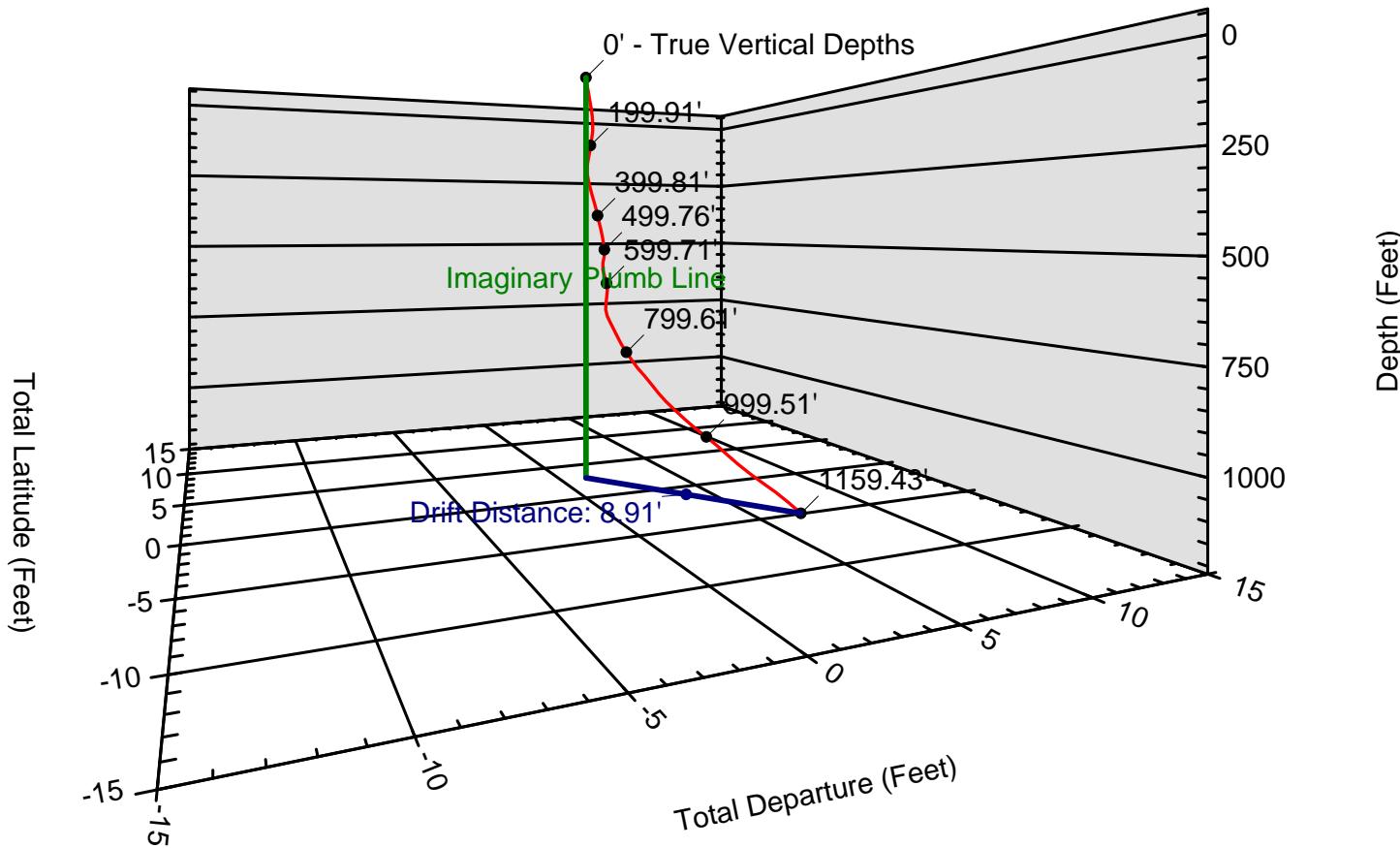
Southwest Exploration Services, LLC (480) 926-4558

3D PROJECTION VIEW - R-07

FLORENCE COPPER

Drift Distance = 8.91 Feet Drift Bearing = 143.7 Degrees True Vertical Depth = 1159.43 Feet

158.0



Date of Survey: Wednesday - February 7, 2018

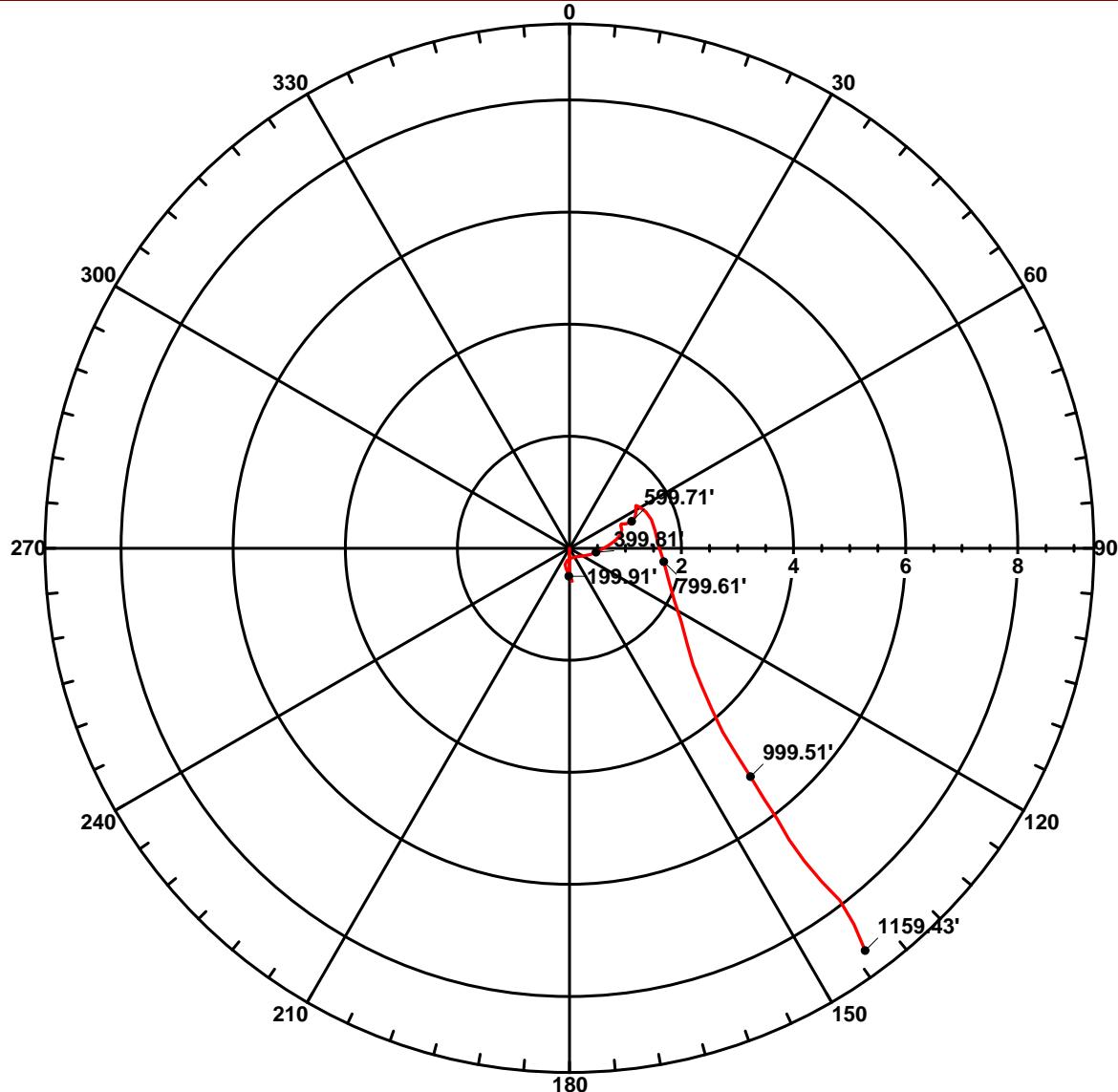
Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

POLAR VIEW - R-07

FLORENCE COPPER

Drift Distance = 8.91 Feet Drift Bearing = 143.7 Degrees True Vertical Depth = 1159.43 Feet



Date of Survey: Wednesday - February 7, 2018

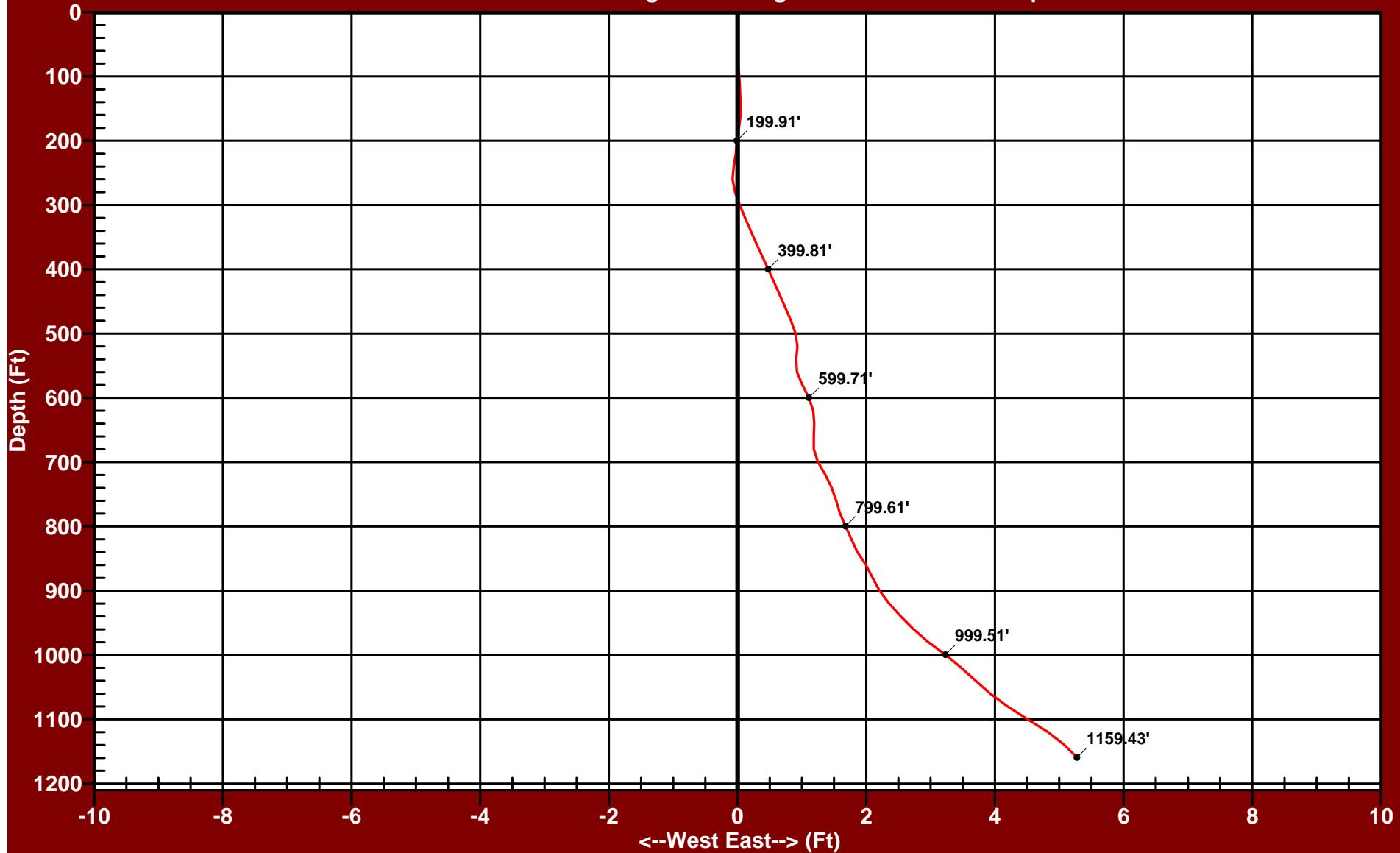
Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

EASTING RECTANGULAR VIEW - R-07

FLORENCE COPPER

Drift Distance = 8.91 Feet Drift Bearing = 143.7 Degrees True Vertical Depth = 1159.43 Feet



Date of Survey: Wednesday - February 7, 2018

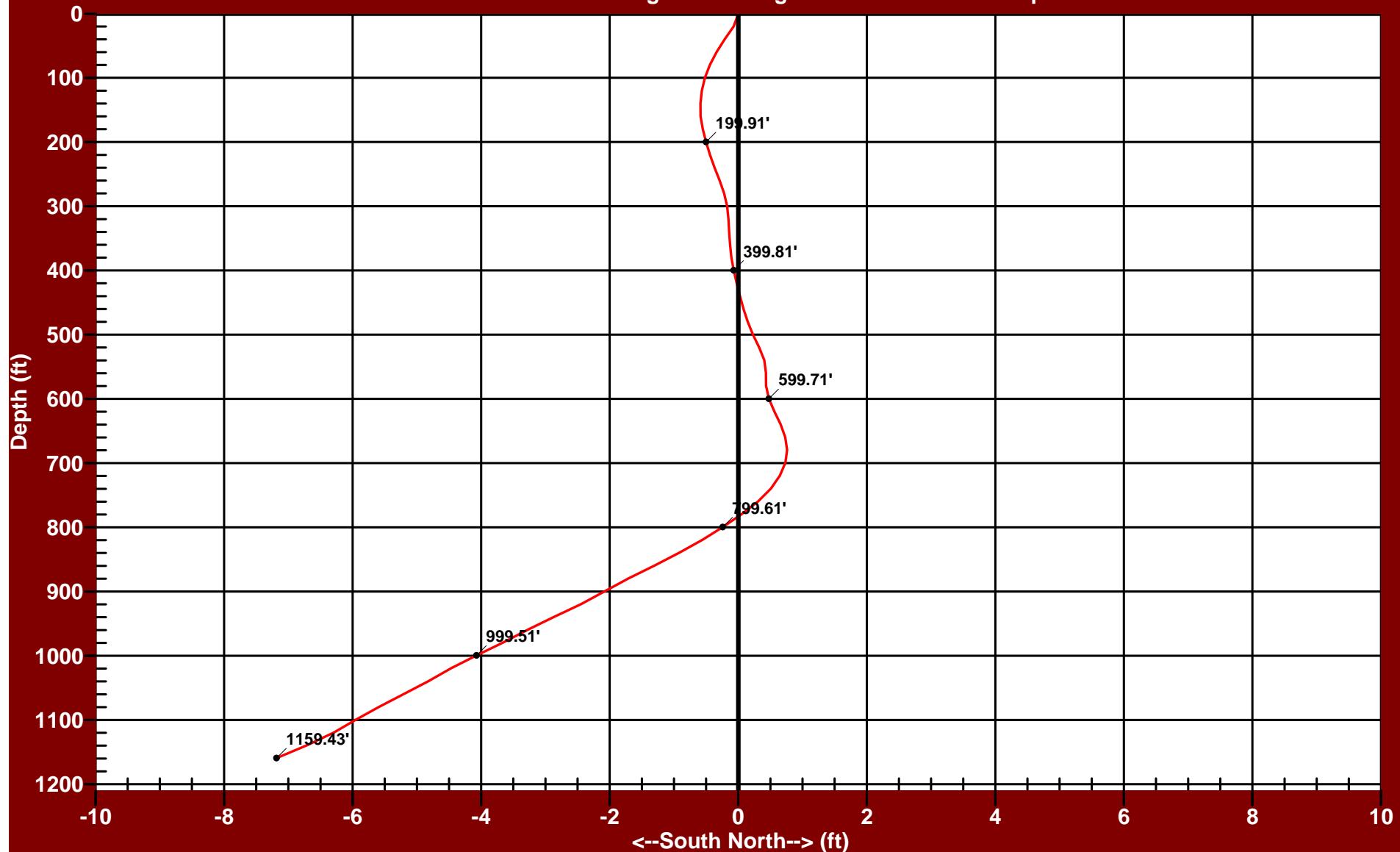
Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

NORTHING RECTANGULAR VIEW - R-07

FLORENCE COPPER

Drift Distance = 8.91 Feet Drift Bearing = 143.7 Degrees True Vertical Depth = 1159.43 Feet



Date of Survey: Wednesday - February 7, 2018

Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558